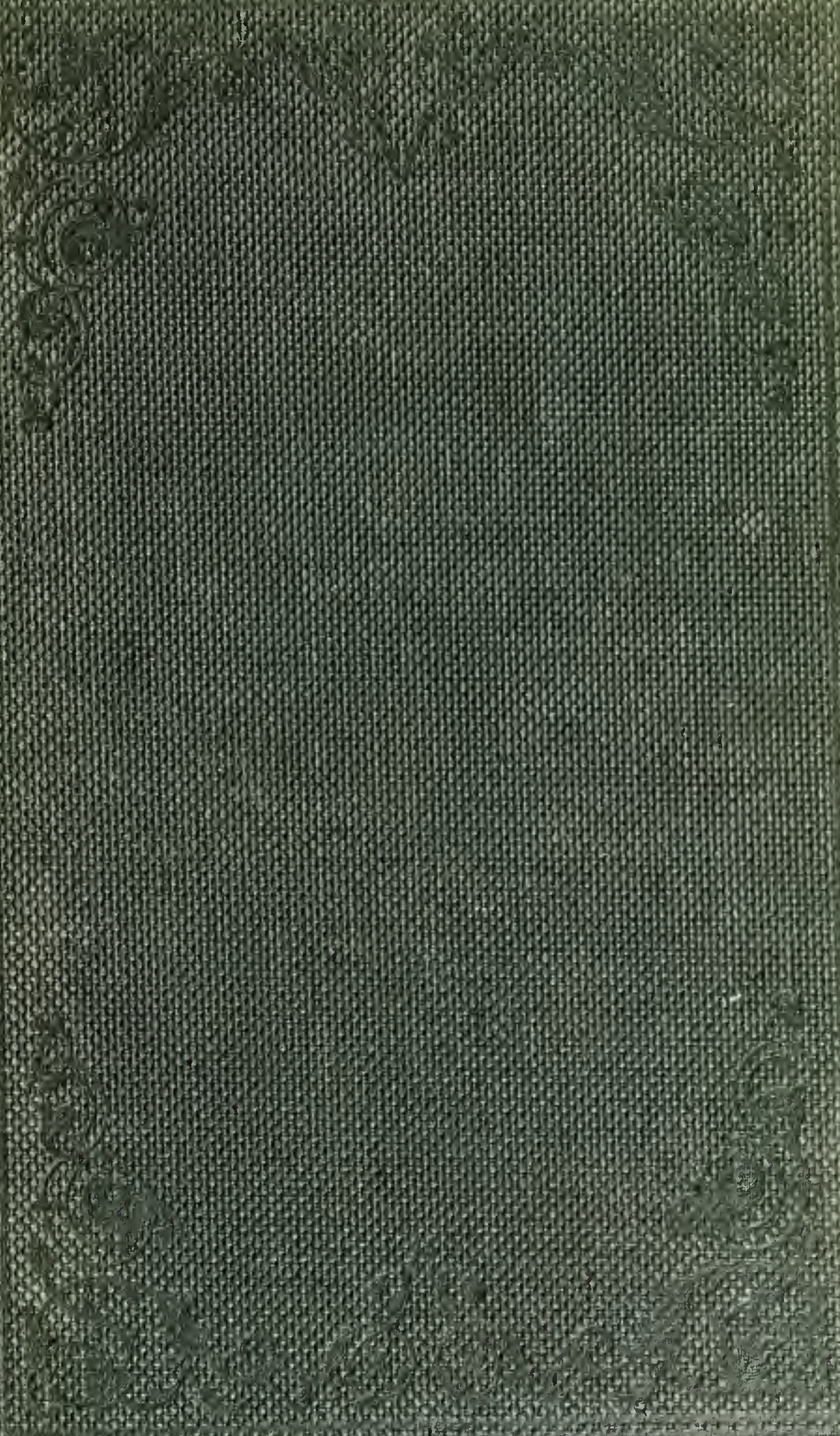

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THE

CANADIAN CANALS:

THEIR HISTORY AND COST,

WITH

AN INQUIRY INTO THE POLICY

NECESSARY TO

ADVANCE THE WELL-BEING OF THE PROVINCE.

BY

WILLIAM KINGSFORD,

CIVIL ENGINEER.

ὥστ᾽ εἴ τί σοι πρὸς καιρὸν ἐννέπειν δοκῶ,
πάρεστι χρῆςθαι τυῖς τ᾽ ἐμοῖς λόγοις.
ΣΟΦΟΚΛΗΣ, Τραχῖνιαι.

TORONTO:
ROLLO & ADAM.
1865.

Entered according to the Act of Parliament, in the year One Thousand Eight Hundred and Sixty-five, by WILLIAM KINGSFORD, Civil Engineer, in the Office of the Registrar of the Province of Canada.

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PREFACE.

The various unconnected efforts, which in different localities, are directed to Canal projects, and the attention which Canadian affairs are now receiving in England, justify the hope that this volume may be regarded as not entirely ill-timed; more especially as it sets forth a policy in respect to the inland navigation, which has in view the advancement of no particular district, but is calculated favorably to affect the whole Province. The advocacy of the policy enunciated has been kept as distinct as possible from questions with which it has no connection. It has been limited to an examination of the anticipated financial and political results, conjointly with an inquiry into the schemes of a different character, which have been brought forward by individual or municipal effort. No allusion is made to existing political parties, and little is said regarding the proposed Confederation, for both are without bearing on the subject. Whatever be our form of government, the Provincial requirements are the same; and one of the first duties of the Executive, whatsoever opinions it may represent, is the development of our material prosperity by the means at its command.

It may be claimed with regard to the following pages that no effort has been spared to obtain reliable information; where there is a failure in this respect, it may fairly be said that it is not attributable to indifference or want of attention. Still, in bringing together many figures and facts from various sources, avoidance of error is difficult, even when the greatest care is taken to obtain correctness.

To readers not intimately acquainted with the geography of Canada and of the State of New York, reference to a Map will be necessary. This information can be supplied by any ordinary Atlas. The extent of the territory comprised, would have made the preparation of a Map, on a sufficient scale, a work of time; and it is considered inadvisable to delay the appearance of the book in order to include it.

In closing these remarks, I feel it incumbent on me to thank those gentlemen who have assisted me, by answering my inquiries, or by obtaining for me the public documents I needed. In many instances, I have been laid under deep obligations, of which I entertain a very high sense.

W. K.

TORONTO, 24th April, 1865.

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CORRIGENDA.

Page 27, line 1, for “63,” read “60.”
“ 28, “ 10, “ “170,” “ “204.”
“ 28, “ 12, “ “300,” “ “217.”
“ 28, “ 13, “ “70,” “ “60.”
“ 51, “ 7, (from bottom,) for “Ellis,” read “Ellice.”

CHAPTER I.

THE ARGUMENT.

The present time may be considered opportune to discuss the character of the improvements necessary to advance the well-being of Western Canada. We are on the eve of great political changes, the significance of which is imperfectly understood; still, few of us could be brought to admit that they will be without their influence. Growing out of party embarrassments, rather than following a publicly expressed desire for new political relations, the plan of Confederation has been matured without any expressed recognition of the necessities which spring from geographical situation. No defined view has been put forth of local or general requirements, or of the plans which are potential to supply them. But in a country of the extent of Canada, there must be distinctions in this respect which cannot be driven to the background.

An attempt is made in these pages to enquire whether the adoption of any particular policy be desirable, and an examination is made into the character and capacity of the public works which have been constructed and are managed by the Province, the Canadian canals. In many points of view they do not satisfy expectation. Of extraordinary extent, and admitting a navigation equalled in no other artificial waters in the world, and although, undoubtedly, the natural outlet for the immense commerce of the Western Lakes, the canals are unremunerative, and fail also to extend all the anticipated indirect advantages. Nevertheless, it is asserted that their failure may be traced, not to any error in the principle on which the works were conceived, but from the mode in which the principle has been carried out. In the meantime the Province has to pay a heavy annual tax in the shape of interest on the capital invested in them; while, on the other hand, the limit imposed by the works themselves has a tendency to take the trade from the western cities to concentrate it elsewhere. There is no law which irrevocably directs this condition; and it is but fair to enquire if any measure to better it be feasible. In more points cf view than one, different districts, however subordinate to a general system, need special forethought under the aspects peculiar to each of them; and although it is difficult in the extreme to reconcile apparently opposing interests, it is a true principle of government, that no sacrifice should be exacted in one quarter in order that benefit may be extended in another.

Between the dwellers in the districts which centre at Montreal, and the inhabitants who cluster round the western lakes, opposite commercial interests have created divergences of thought. The former desire that Montreal should continue the head of the salt water navigation, and the foot of the canal system; the latter necessarily seek a communication with the ocean practicable to their use. The Montreal merchant can see no necessity for improvements which would do away with the transhipment paying a toll to his city. The western forwarder holds that it is mere commercial despotism to limit his operations to the Canals. Accordingly we have a cardinal difference in the views with which projects of change are entertained. In Montreal, all that is desired is the enlargement of the size of the lock; increase of depth is but little urged, or if it be at all advanced, only to the extent that the heavy laden lake propeller may discharge an increased cargo at the Lachine Basin. Accordingly, we may understand the adherance of that city to the Ottawa navigation scheme and the Caughnawaga Canal. The struggle to remove the bar to the eastern approach to

Montreal of deep vessels, was conducted by men still in the vigor of life, and the effort dates but a few years back. Until the deepening of Lake St. Peter, to admit vessels drawing twenty feet of water, Quebec retained its supremacy; but so soon as the St. Lawrence, above Quebec, was improved, the advantage was transferred to Montreal. It is argued, that were the depth of water thrown yet farther back, trade would follow it; and we must remember that the claim for the privilege is not limited to Canada. The cities of the lakes have no access to the ocean but by a narrow, inconvenient and expensive navigation, for the attempt to pursue the St. Lawrence to the sea, from the restrictions imposed, has been tried and found unsatisfactory. New York therefore remains the seaport for Michigan and Illinois; for commerce as a rule, takes the channel by which it is best conducted. The timber trade is an especial proof of this law. No effort could divert it from Quebec. On the other hand, it is difficult to understand why Kingston, Toronto and Hamilton, and the other cities on Lake Ontario, Buffalo, Cleveland, Detroit, Chicago, and the grain depôts of the North-West, with all the advantages of the St. Lawrence at their command, should not transmit directly to Europe the produce of their district, and bring back cargoes in return. There is no special reason why transhipment should take place at the seaboard, if we omit the important one that vessels of large tonnage carry cheaper than vessels of smaller tonnage. Conceding the principle, it is important to inquire whether a class of vessels could not be built in Western Canada and in the Western States, which would satisfactorily perform this trade, and keep the profit and emolument in the west, so that the particular advantages which, in a greater or less degree are enjoyed by New York and Montreal, should be reserved for the western port, where the cargo can be delivered unbroken. There is only one material impediment in the way, and it is the limit of navigation, contracted by the insufficient depth of the canals and the size of the locks. The remedy has been often considered; and before the canals were even laid out, the inland seas of the St. Lawrence were regarded as so important, that a full and efficient passage from them to the ocean, was looked upon as indispensable. The desire has been a dream of the last half century. It has frequently been brought to the notice of the public. The subject has been treated with more or less ability, and has been advanced even with exaggerated anticipations. The misfortune is, that it has never been taken up as a connected whole, and has never been pushed to its legitimate conclusions. Perhaps of all the projects of the day it is the most vital to the interests of the west, both of Canada and the Lake States; but for all this, as a general rule, it is very little known and considered. If there ever was a time when the discussion of canal improvement should have been carefully and earnestly made, it was when the proposed political changes were under discussion. It was then that a guarantee should have been exacted for our commercial future, and a record should have been made deliberately affirming that an increased navigation of the St. Lawrence was a recognised part of the system, and that in justice to Western Canada, it should be among the earliest improvements carried out.

It is not now too late to bring this subject before the country, and these remarks are written for the purpose of directing the public mind to consider what position the Canada of the lakes, will hold in the new Confederacy, in the matter of internal navigation. At the extreme west of the British American Provinces, Western Canada is alone interested in the full and complete deepening of the canals to the extent which the improved natural navigation of the St. Lawrence would determine. The remaining provinces would be likely to advocate only a partial improvement; for so long as the navigation be compressed within its present limits, the carrying trade will be maintained in its existing relations. Turning to the maritime provinces, whatever political and military considerations may be brought to bear on the advocacy of the Halifax Railway, for the purposes of the interchange of products, it is utterly valueless to the west. We have little intercourse with the Lower Provinces; but we desire to possess artificially what they enjoy naturally, communication with the ocean for sea-going vessels; and we have not one word of positive assurance, or the slightest trace of a guarantee that this want will be supplied. And in spite of this unsatisfactory position, no public man has approached the question; no single Board of Trade has advanced a plea for its consideration, and the arrangements are daily advancing to their consummation without the most languid sign that our future is assured.*

The canal policy, as a provincial question, is very imperfectly understood. The facts necessary for its full comprehension have never been arranged. The canals are not used to the same extent as railways; and in ascending the river, the Beauharnois is the only canal passed through by day.

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* From a recent speech of Mr. Tilley, at St. John, N.B., we hear something new about the way in which the Conference arranged the finances. They began with the Canadian loan to the railways. That to the Grand Trunk was set down as valueless; and so it is no doubt if we are to be guided solely by what it is likely ever to produce in the way of a direct return. But can we fairly apply such a standard to a great work of public necessity? Would it not be more equitable to look at all the public works in the light of the indirect benefits they confer, as well as to see whether they are directly productive, in a pecuniary sense? Mr. Tilley lumped the loans to the Great Western and the Northern together; and set down $330,000 as the interest received from the two companies. Whatever is paid on these loans is paid solely by the Great Western. The product of the canals he set down at $260,000, and timber slides at $100,000. "Here then," said Mr. Tilley, "are proceeds amounting to $700,000, or nearly one and a quarter per cent. on a debt of sixty-two millions." Turning from Canada to New Brunswick, Mr. Tilley names a lump sum, $40,000, as the product * * * or about three-quarters of one per cent. on the cost. We are given to understand that the $40,000 is profit, but this will be delusive unless a sufficient allowance be made for the wear and tear of the road. Mr. Tilley comes finally to the Nova Scotia railways. Here the profit is also set down at $40,000; but as the capital is less, the profit is one and a half per cent.

Thus, then, throwing the Grand Trunk loan out of the account, as permanently unproductive, Canada shows a return of one and a quarter per cent. on an outlay of sixty-two and a half million of dollars on public works; Nova Scotia shows a like yield on its railway expenditure, and New Brunswick not much more than half that rate. It is possible that Mr. Tilley has not given us the full explanation, but has

In descending, the steamboat takes the rapids. Therefore, there are no adventitious circumstances to keep them prominently before the public mind. They are seldom spoken of in the public journals. No calamitous accident leads to their mention. There is no connected history of them, and the casual notice given to them in descriptive books fails to convey any idea of their purport. That there are certain falls in the St. Lawrence which are called rapids, and which are passed by means of canals, constitutes the general stock of knowledge concerning them. These pages, therefore, supply a void when they give an account of these works: their length, character, cost and revenue. There is much in their history which will repay the study of the facts, and the financial and political events connected with them are worthy of examination, as no imperfect guides for the future. It is considered that without this information the subject would be less easily understood, and as no manual of these works exists, it is thought that the information, compiled with care, will be useful as a matter of reference. To the description of the

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contented himself with that part of it which would tell in his favor. He does not explain how, on this principle of measuring the assets by the productiveness of the expenditure, the difference necessary to adjust the balance arrived at was made out. On this point more information is wanting. From all we have previously heard on this part of the subject, it is evident that the balance was struck from a comparison of the entire debt of each Province, without regard to their productiveness, direct or indirect.

Mr. Tilley, we are sorry to say, does not give us much hope of the speedy enlargement of the canals. * * * "The conference," says Mr. Tilley, "agreed to build the railroad without delay, the canals as soon as the state of the finances will permit." But he ridicules the idea that the finances will be held at once to admit of this being done. "Canada," says Mr. Tilley, "could not have been brought into the Union on a promise to build her canals; for the railroad will cost $12,000,000, which added to the $22,000,000 for canals, would be an amount far above what they could have gained them for without Confederation." That is, we take it—for the meaning is not very clear—that the prospect of an enlargement of the canals did not induce Canada to agree to enter the Union; since, taking into account the increased contribution she will have to make towards the Intercolonial railroad, she will have to pay, under the Union, for the two works, a much larger sum than would have sufficed to enlarge her canals and secure the construction of the railway, in the absence of Confederation. It is not a good sign to see different members of the Conference putting different constructions upon the meaning of the agreement come to. There can be no doubt, however, that Mr. Tilley is in the right; and that the enlargement of the canals must await the convenient and uncertain season when the state of the Confederate finances will admit of its being done.—*Toronto Leader, 15th Feb.*, 1865.

present canal system, an account of the several projects before the public has been added, and the advantages of the St. Lawrence route are examined in every phase in which they present themselves.

We have to turn back a quarter of a century to note the wonderful changes which the Canadian canals have effected. All the great improvements of the Province date from their completion. Even the introduction of steam gave but a faint impetus to progress on the shores of the Western lakes. Before its introduction, the country was almost out of the pale of civilization. A man leaving Toronto for Montreal, looked to a journey of a fortnight. He made his will and arranged his affairs, solemnly bade farewell to his family with far more feeling than a traveller in modern days would leave Quebec for Liverpool. The Durham boat in which he started was small, without accommodation, and with little to redeem its long trip; and as these small vessels approached the rapids, passengers held their breath as men do when they encounter danger.* To pull these vessels up against the stream was a painful toil. Some small locks* yet exist by the Coteau Rapids near the half-ruined fort, as a representative of the means taken in the earlier history of the country to get past the most troublesome waters. Men among us, who are yet in mid-life, have seen the painful poling of the Batteaus to pass those spots, and how often it seemed as if the toil would never be rewarded with success. Even the introduction of steam could not break through the limit which the imperfect navigation of the St. Lawrence imposed. Thus on leaving Montreal, the stage drove the passengers to Lachine, where they took a steamboat to the Cascades, a distance of 24 miles. At the Cascades they took a second stage, in which they drove to the Coteau Landing, some 16 miles. From Coteau Landing, a second steamboat carried them 41 miles, to take a third stage at Cornwall, by which they travelled a distance of 12 miles, to Dickinson's Landing, and at Dickinson's Landing they embarked on another steamboat which carried them to the upper lakes. Such travelling was necessarily tedious and expensive; and until the completion of the canals, so it remained. Twenty years have elapsed since the passenger first could go on board, from the basin at Montreal, if he saw fit, and remain undisturbed till he landed at Hamilton. Accordingly, a generation has grown up since the improved route has been established, and hence it is thought proper to preserve a record of it here.

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* In the advance upon Montreal in 1760, General Murray marched from Quebec, Colonel Haviland by Lake Champlain, while General Amherst ascended from the Hudson through the valley of the Mohawk by Lake Oneida and the Oswego River to Lake Ontario. His force consisted of 10,000 men. Having arrived at the Lake he proceeded to descend the St. Lawrence, on his way investing and reducing Ogdensburg, which the Annual Register describes as L'Isle Royal, an authority accepted in his history by Lord Mahon. In the French records, however, the fort is mentioned as Fort de Levis, and at the period was commanded by Le Commandant Pouchet. I copy the rest of the narrative from the Annual Register, 1760, page 59.

"This being a post of importance both to command Lake Ontario and to cover our " frontier, the General spent some days here in order to repair the fort, and at the " same time to fit out his vessels, and to prepare all things, for passing his troops down " the river, the most dangerous part of which he was now to encounter, as all the " rapids lie between this place and Montreal; but notwithstanding all precautions near " ninety men were drowned in passing these dangerous falls, and a great number of " vessels broke to pieces. This loss from so large an embarkation, in such circum-" stances, is to be regarded as very inconsiderable. At length after a tedious, fatigu-" ing, and dangerous voyage of *two months and seventeen days* since they left Sche-" nectady, the English saw to their great joy the Isle of Montreal, the object of their " ardent wishes and the period of the termination of their labors." The rapids were the Cedars. The exact loss is given as 64 barges and 88 men.

Mr. Bancroft in his history, volume 4, page 260, expresses surprise that Amherst should have taken this route. The reason is very obvious. It was to prevent the retreat of the remainder of the French army by the St. Lawrence to the valley of the Mississippi. A line of tactics correct in theoretical strategy as it proved successful in practice. It is a curious analogy that the western producer hopeless of the improvement of the St. Lawrence, should like M. de Vaudreuil a century back, turn his thoughts to the Great Western stream as a refuge. (Report Canal Convention held at Chicago, 1863, *passim.*)

It was the opening of the canals which gave life and vigor to Western Canada, and the very prosperity to which they have led has made them insufficient. They now no longer suffice for the wants they themselves have created; and it is not to Canada alone that they become a paramount necessity. They are as essential to the Western States as to ourselves. The natural route to New York and Boston is by them, and it is only by the Saint Lawrence that the Western flag can ever seek the sea. No valid argument can be adduced to show that any scheme of any character soever can take precedence of their enlargement. The extent to which it may be carried, must depend upon enquiry and examination. The first step should be a careful survey of the river. The unobstructed portions of the St. Lawrence are capable of a definite navigation, the extent of which, it would be inadvisable to increase; a navigation which would possibly necessitate the removal of certain impediments occurring in the river and the minor lakes. It is necessary, first, to establish clearly what obstructions do exist; we can then infer what cost would be justifiable in the improvement of them. The navigation of the St. Lawrence may be divided into two classes. There is the navigation of Lake Erie proper, employing a class of vessels which do not seek to go lower than Buffalo—propellors and steamboats, the size of which is kept in restraint only by the St. Clair Flats. On the other hand, there is the downward navigation to Montreal. To enlarge the Welland Canal beyond the depth attainable over the St. Clair Flats, would be a useless and unwarranted expense. Should an increase of depth be practicable, the limit must be sought in the capacity of the river between Caughnawaga and Kingston.

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* The three small locks at the Cascades, Split Rock, and Coteau du Lac, were even a source of revenue. In 1816, the revenue, after deducting expenses, was nearly £566; in 1820, it amounted to £1404. It decreased in 1826, and finally rose in 1833 to £2218, independently of the expenses, £876. 863 Batteaux and 612 Durham boats passed through this year. The returns will be found in Appendix Z, vol. ii., 1842.

The present argument is narrowed by the admitted fact that a large population is gathered round the lakes, and that an extraordinary traffic flows from there. Two channels contend to obtain it: the one by New York, narrow and insufficient, and developed to its full extent; the other by Montreal, with every natural advantage, incomplete and unexpanded, but containing all the elements of excellence and superiority, if they be called forth. To control in a greater degree the first, the commerce of the west is taxed for the special advantage of its seaport. To heighten the character of the second, if brought out to its legitimate dimension, it would create a series of seaports from one end of the route to the other. The knowledge of this possible condition has given rise to the many schemes to obtain this trade, most of which are inefficient and unnecessary, for they do not meet the one end desired, although they are all founded on the notorious truth of the failure of the St. Lawrence Canals.

If we turn to the canals themselves, we may find all we need to guide us. They are constructed on a river renowned for its extent and depth, broken by stretches of shallow turbulent water, which they avoid. It is its very navigation which calls for larger and deeper locks. Along the banks of the St. Lawrence and the lakes, are a large and active population, great cities, a commerce fabulous in extent. On the whole thousand miles of its course, there is the one demand for that direct communication with the ocean, which is now denied to its inhabitants. May we not ask if the canals are made sufficiently large to attain this end, if they are deepened and developed to the wants of the West, whether produce for exportation will flow down, and imported merchandize ascend by them? Will the great cost of turning these insufficient links of an artificial navigation, into the continuation of the natural channel, imposed by the river itself, prove remunerative as an investment? The Treasury regulations of the United States could not then close the St. Lawrence to imports; and it would be the interest of American vessels to pass through the lower canals as they now pass through the Welland, to Oswego.

The Western cities of Canada, naturally desire to retain control of the business they have hitherto enjoyed; the supply of the district of country, to which geographically speaking, each should be the commercial centre. But of late years, the tendency of railway communication has been to carry from the west, buyers to the east, for the reason that they can more profitably make their purchases at Montreal. An advantage is always obtained at sea-ports where the cargo is broken up and separated; and if cargoes could be brought intact to Toronto or Hamilton, the same inducements would be offered. If this be the case, the representatives of Western Canada ought not to allow year to succeed year, without effort on their part to remove a condition of commercial inferiority, which, if uncared for, must have a disastrous influence on all business relations. But yet, not even any enquiry is vouchsafed into the future canal policy, and the subject is regarded on all sides with stolid indifference; while the principle on which our future prosperity depends is left unexamined, as if change were both impossible and undesirable. As if no alternative were left but to continue a discontented existence, which, as in the case of an old paralyzed man, forethought cannot cheer, or science prolong. The community of the West enjoys a youth, young on this continent. It has every thing to hope and to expect, yet it is left uncared for, as if in decrepitude.

An attempt is made in these pages succinctly, to state the case. Even if the argument be indifferently advanced, the subject at least has been placed in a clear light from the facts which have been collected; and if no result be attained beyond awakening the attention of the community to its necessities, no small stride will be made towards the realization of a sound policy, which the more it is considered the more just and desirable it will appear. When firmly demanded by the west, it cannot be withheld. If the public voice can be directed earnestly and constantly to claim the completion of public works which, while they favor western interests will add to the revenue, it must be heard. It cannot be stifled. But there must be unity, prudence, and an unflinching advocacy of one and the same policy. The one measure must be demanded equally by all sections, the one remedy to our depression must be every where exacted.

If the contrary come to pass, if apathy and indifference still prevail, if energy take the form of local zeal, if useless and impossible projects be advocated, if the interest of the few mislead the judgment of the many, if there be a division of effort, and rival claimants dispute for rival theories—there will arise only failure, dissatisfaction and disappointment. The really necessary improvement will be delayed for half a century, and the heritage of Western Canada will not be success and prosperity, but its divided counsels will gain for it, contempt and its usual accompaniment, neglect.

The published proceedings of the Quebec Conference establish that the enlargement of the canals has received little consideration, and that no definite policy, with regard to them, has been agreed upon. Certainly none has been enunciated. The 69th Resolution, supposed to refer to the subject, is in these words:

" The communications with the North-Western Territory, " and the improvements required for the development of the " trade of the Great West with the Seaboard, are regarded " by this Conference as subjects of the highest importance " to the Federated Provinces, and shall be prosecuted at the " earliest possible period that the state of the finances will " permit."

No time is mentioned for the commencement of the work. Its extent is not declared. Its character is left dubious, and is open to discussion as any other matter of argument. It is classified with a project sustained by few supporters, with which it has no connection, and which can only be ranked among the minor requirements. By implication, the language of the resolution holds the improvement of the canals is not of immediate and paramount necessity. As a consequence, that improvement may be called upon to yield precedence to a measure, which for many years can have no possible bearing upon Canadian interests. " When the finances will permit," is at best a vague, unsatisfactory phrase, without precise meaning, and one which may be explained by the vote of a majority. It is evident that in this respect Western Canada is quite at the mercy of the Confederation, if that scheme be effected on the present basis of arrangement. No pledge has been formally given —we are not told that it has been demanded by the official guardians of her interests—that the policy on which her prosperity depends will be consummated without unnecessary delay. The future accordingly is unassured, uncertain and unsatisfactory.

CHAPTER II.

THE CANALS—THEIR CHARACTER, COST AND HISTORY.

The Canal system of Canada may be described under four heads.

1. The Chambly Canal connecting the waters of the Saint Lawrence with the Hudson River at Waterford, through the Richelieu, Lake Champlain, and the Whitehall Canal.

2. The Rideau Canal, connecting Lake Ontario at Kingston with the Ottawa River at Bytown, now called Ottawa; and so by the Grenville and Carillon Canals with the Saint Lawrence at the Island of Montreal, by the well known Saint Anne's Lock.

3. The Saint Lawrence Canals, by which the Saint Lawrence is itself made navigable.

4. The Welland Canal, making a connection between Lakes Ontario and Erie.

THE CHAMBLY CANAL

Is generally opened on the last days of April or the first week in May, and remains in working order until the end of November or the beginning of December. The navigation may be stated generally to extend from 215 to 220 days, including Sundays. In some seasons more, in some less.

The Canal is 11½ miles in length, with 9 locks 120 feet in length by 24 feet wide. The depth of water on the sills is 6 feet. The width of Canal is 36 feet at bottom and 60 feet at surface.

The project of this Canal first came before the public as a private speculation, and in 1819 a Company was formed and incorporated to construct it. As years passed and no steps were taken to commence the work, the Legislative Assembly of Lower Canada presented an address to the Governor General, praying that the Canal might be undertaken by the Government. The work was commenced 1st October, 1831, £60,000 having been voted to complete it. The original estimate was £50,000. Captain Melhuish of the Royal Engineers, to whom the project was referred, considered that amount as much too low, and it was accordingly raised by him to £96,745. Nevertheless the Commissioners entrusted with the management rejected his opinion, and let the work for £46,218. It was carried on until the money originally voted and £6,000 in addition were expended; but the funds being exhausted, nothing further could be done. A further sum of £5,000 was obtained, but it was absorbed in the necessary repairs. The Canal however was still far from complete; and from these causes and the political troubles of 1837-8 it remained in an unfinished condition until 1840, when £35,000 was obtained from the legislature. In the interval the Canal was used between Chambly and Saint John's, no connection existing with the River Richelieu, yielding an annual revenue of £500. But in 1840 operations were resumed and the work was continued until the 17th November, 1843, when the Canal was opened for navigation. A supplemental sum of £13,200 was paid after the Union of the Provinces.

The cost may thus be stated: before the Union..	$428,016
Expended by Lower Canada since the Union of the Provinces	52,800
	$480,816

This Canal is constructed to overcome the Chambly Rapids which run almost interruptedly from Saint John's to Chambly, the difference of level being 74 feet.

This difficulty being removed the route is open from the Saint Lawrence, by the Richelieu at Sorel, to Chambly, thence by the Chambly Canal to Saint John's, through Lake Champlain to Whitehall, and thence by the New York Champlain Canal, 67 miles, to Waterford on the Hudson River, distant from New York 153 miles.

Twenty years ago, before the construction of railways, the summer travel to New York from Montreal passed entirely through the Champlain Canal in passenger boats drawn by horses; a fact which may explain the early construction of the Saint Lawrence and Champlain Railroad from Laprarie to Saint John s, which in those days ceased to run when the navigation was closed, and the Lake Champlain Steamers ceased to ply.

The limited capacity of the Chambly Canal, and the insufficient navigation which it imposes, have led to many projects by which the route from the upper Saint Lawrence may be shortened and improved. From Montreal the distance to reach Saint John's, by water, is

By the Saint Lawrence	45 miles.
" Richelieu	45½ "
" Chambly Canal	11½ "
	102 miles.

From Saint John's to Rouse's Point, at the head of Lake Champlain, is 23 miles; from thence to Whitehall, near the foot of the Lake, 111 miles. Sorel is 45 miles from Three Rivers, and is accordingly equi-distant from that place and Montreal. Its connection with Quebec is unimportant as no traffic passes thence to the Hudson. Of late years the opening of the Timber trade of the River Saint Maurice has added to the importance of the Chambly Canal, which generally speaking had previously been used only for the Ottawa lumber for the United States markets, and the traffic consequent upon this business. Lumber from both regions reaches the Hudson through the Whitehall Canal, or can be loaded at Burlington on the cars for the New England States. The completion of the branch of the Grand Trunk from Arthabaska on the Quebec and Richmond line to Doucet's Landing, opposite Three Rivers, may possibly divert the former branch of the traffic.

The limit of the locks may attract attention, but the shallowness of the Richelieu River in reality determines the capacity of the vessels which enter the canal. The Report of the Commissioner of Public Works, 1861, describes them as being 114 feet long. Since the completion of the Canal attempts have been made to remedy the deficiency of water. At Saint Ours, twelve miles from Sorel, a dam has been thrown across the river, and a lock 200 x 45 feet, with a lift of 6 feet has been constructed. This work was completed in 1849 at a cost of $144,553.79.

The public documents give the revenue of the Canal and Saint Ours lock for 1863 as $25,600 and the cost of management and repairs $14,453.12 for the Canal, and $3119.40 for Saint Ours lock—total $17.672 52. In 1859 the receipts were $16,520.59.

A more direct Canal communication is proposed, which having its starting place on the South Shore as nearly as practicable opposite to Montreal, should proceed by the shortest direction to the upper navigable waters of the Richelieu. Several lines have been suggested, and a special examination of the various projects, with a carefully made survey of the land, have placed the subject in a clear light. They are as follows :

1. The enlargement of the Chambly Canal, with the dam at Saint Ours raised 4 feet in height to ensure 10 feet of water in the Richelieu in the driest season.

The estimated cost is $2,016,080 ; but it must be remarked that although the capacity of the Canal would be extended, the present distance would by no means be decreased.

2. A Canal from Longueuil, immediately opposite Mon-

treal, to Saint John's. The distance would be 28¼ miles. The cost $3,473,360.

3. A Canal from Caughnawaga, nearly opposite the terminus of the Railway at Lachine to Saint John's, with the Champlain level as summit. Length 34.46 miles with two ascending locks from the Saint Lawrence, and a guard lock at Saint John's. The cost $3,706,230.

4. A Canal from Caughnawaga to Saint John's, supplied by a feeder from the Saint Lawrence, which should be navigable, the water level being 37½ feet above Lake Champlain. Length 25½ miles. The main Canal would have five ascending locks from the Saint Lawrence at Caughnawaga with three descending locks to Lake Champlain.

Thus to compare it with line No. 3, it will have six locks more but be nine miles shorter. The feeder would have a length of 16 miles taken from the higher level of the Beauharnois Canal.

		TOTAL.
The cost of the Canal is estimated at..	$2,979,240	
With navigable feeder.............	1,288,650	$4,267,890
With feeder not navigable	308,000	3,287,240

5. In reality, to make the proposed Canal a branch of the Beauharnois Canal, viz.:—by entering at the outlet at Beauharnois, and following 2½ miles on the Beauharnois Canal, and thence running on to Saint John's a distance of 37.66 miles, descending to the Champlain Canal by three locks.

The cost.................................. $3,369,400

The above estimates are for a Canal 80 feet in width at bottom with slopes 2 to 1, which with 11 feet of water would give 124 feet *à fleur d'eau.* The Locks to be 230 feet long, in the clear between the gates 36 feet wide with 10 feet depth of water on the sills.

The objects proposed by the Canal are two fold.

I. To compete with the Erie Canal, both by the route at its entrance at Buffalo, and *viâ* Oswego; and to create facilities for vessels from the upper lakes to pass down the Saint Lawrence, through the proposed Caughnawaga Canal to Lake Champlain, and thence to New York. Likewise to ensure an easy and cheap communication for vessels freighted with wheat and other grain for the Eastern States, to connect with the Boston Railway at Burlington.

II. To provide an improved communication for the Ottawa lumber trade, and its consequent business with New York and the Eastern States.

I. It may be remarked that the destination of a vessel will be determined before it leaves Lake Erie; and that consequently few occasions will arise, when a vessel passing through the Saint Lawrence Canals, within a few hours of Montreal, would seek the New York markets.

The distance from the east of Lake Erie by the Erie Canal to Albany, entering at Buffalo, is 352 miles.

Viâ Oswego by the Welland Canal it is:

By Welland Canal	28 miles.
" Lake Ontario to Oswego	138 "
" Oswego Canal to Syracuse	38 "
" Erie Canal from Syracuse to Albany	166 "
Total	370 miles.

Being 232 miles Canal navigation.
" 138 " Lake "

By the Saint Lawrence it is as follows:—

By Welland Canal		28 miles.
" Lake Ontario to Kingston		160 "
" Kingston to Caughnawaga:		
River navigation	132 miles.	
Canal	35 "	
		167 "
Carried forward		355 miles.

Brought forward	355	miles.
By Caughnawaga Canal	25½	"
" River Richelieu to Rouse's Point	23	"
" Lake Champlain to Whitehall	111	"
" New York Champlain Canal to Albany	73	"
Total	587½	miles

Being 161½ miles Canal navigation.
" 426 " Lake and River navigation.

We observe by this comparison that by far the shortest route for a vessel from Albany to the Upper Lakes is by the Erie Canal: accordingly, there must be manifest advantages in other respects to counterbalance the fact, that to reach the foot of Lake Erie by Lake Champlain and the Saint Lawrence, 217 miles additional distance must be travelled. On the other hand we must remember that there would be 70½ miles less canal navigation than by way of Oswego. Therefore with the greater distance, the Champlain and St. Lawrence route, if admitting the passage of vessels of greater tonnage would be preferable. For quicker trips could be made, and from the increased capacity of the vessel, the greater cargo, with the relative less expense would bring more profit to the forwarder. Moreover a vessel of this character could discharge at New York, and avoid the delay and cost of transhipment at Albany entailed upon vessels passing through the Erie Canal. The limited accommodation of the New York Champlain Canal* is a bar to the establish-

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* The length of the Champlain Canal from Whitehall to its junction with the Erie Canal at West Troy is 66¾ miles; continuing by the latter to Albany the distance is increased to 73 miles. It is supplied by a feeder from the upper waters of the Hudson at Glen's Falls, 282 feet above tide water at Albany—7 miles long having 13 locks. The summit level of the Canal is 150 feet above tide water.

The up lockage from junction with Erie Canal at West Troy to summit level at Fort Edward is	125¼ ft.
The Erie Canal level below that point is	24¾ "
	150 "
The down lockage from east end of summit level at Fort Ann to Whitehall is	54¼ "
Accordingly the elevation at Whitehall above tide water at Albany is	95¾ ft.

ment of the trade. Were the enlargement of this Canal an admitted necessity, and it were at once to be undertaken, the route would then assume a character which it has not at present, and the Caughnawaga Canal would be a definite link of it. The necessity of the construction of this work could then be urged. But it can scarcely be hoped that the New York Legislature would desire to encourage an improvement which would create a formidable opposition to the only great state work which it has to protect by legislation. The St. Lawrence has already proved a formidable rival to the New York Canal system, and it seems there is no interest, particular or local, which would be powerful enough to carry any measure at all injurious to the Erie Canal. Besides, in estimating the chances of realizing any project, we must consider the outlay it involves; and certainly to increase the sixty-seven miles of the New York Canal to the size of the proposed improvement of the Saint Lawrence Canals would exact an expenditure of from twelve to fifteen millions of dollars.

It is convenient to state in this place the opposite view. The advocates of the construction of the Caughnawaga Canal totally independent of the improvement of the Whitehall navigation, argue in its favor with much ability. They contend that it would at once take the Western grain trade both for the Eastern States and for New York.

The locks are 20 in number, and 90 ft. by 15 ft. in size, with 4 ft. water on the sills. The only vessels which navigate this Canal are the old fashioned Canal boats towed by horses.

The height of Lake Champlain is here given according to the authority of American Engineers. But it is proper to mention that it is not authenticated by Canadian experience, which places it no higher than 84 feet. That this discrepancy arises from error, is proved, independently of its magnitude, by the fact, that while the Americans taking tide water at Albany as a datum make Lake Erie 565 feet above it, the Canadians taking tide water at Three Rivers as a basis make Lake Erie 564½ feet higher, which would go to shew the not unimportant fact in physical geography that the Saint Lawrence at Three Rivers and the Hudson at Albany are at about the same level. I am not aware that this fact has been previously published, and I owe to Mr. Walter Shanly, that I can state it here. It may be added that this matter has been somewhat closely investigated by us, and the opinion is strongly entertained that the error does not lie on our side.

The New England States form the great mart for Western produce, which now finds its way through the Erie Canal by Buffalo and Oswego, to New York; whence it generally passes by water to Boston and other ports on the north-east coast. What is not taken by water is distributed by railway. It is argued that the imperfections of this route are such, that were facilities given to reach Lake Champlain, that route would be followed to Burlington—a distance by railway from Boston 248 miles—at which point a transhipment would be made to the rail, of the cargo of cereals; the propeller at once obtaining return freight of New England manufactures for the west. A comparison of time is made in order to shew that the 20,000 bushels of wheat or 6,000 barrels of flour would be at Boston long before it had even passed through the Erie Canal; and under one phase the favorable estimate is not to be disputed. But the element of time in this instance is of secondary consideration. Yet are we so sure if a heavy railway traffic of flour and grain passed over the railway there would be no delay? If the transfer were direct from the propeller to the wheat car there would be a certain guarantee of immediate transmission; it would however scarcely be possible to count upon that connection, and it is a legitimate inference that the natural period of the route would be much prolonged by circumstances. On the other hand the present mode of traffic warrants the opinion, that the forwarder of Western produce will cling to the water as long as he is able, unless compelled to abandon it under extremely unfavorable circumstances. But should he desire to transfer to the railway car his freight of breadstuffs for New England; would it not be profitable for him to do so at Ogdensburgh—distant from Burlington by railway 158 miles? This line was built with Boston capital to gain that traffic, but it has not done so. It is true that the distance by the Caughnawaga Canal to the same point would be very little in excess of the railway, 220 miles, of which 69 will be by canal. I at once admit that of the two routes to Burlington the latter would be the best and cheapest ; and taking in view the necessity of transhipment the quickest. But I do not think that the comparison can be allowed to remain in this limit. From Burlington to Boston, *viâ* Vermont Central Railway, is 248 miles, and it seems to me this extent of railway distance is the bar to the route as a whole ; and that were the route to Boston *viâ* the Saint Lawrence and Burlington one advantageous to adopt, the transhipment from the propeller to the rail being a cost and necessity under any circumstances, it would be as profitable to take the rail at Ogdensburg as at Burlington. This presumption is at once rejected, on the ground that a comparison between Ogdensburgh and Albany has a totally different relationship, to the comparison of transhipment at Albany with transhipment at Burlington. But is not the fact clearly stated, when we take into account the railway distance between the three points and Boston ?

	MILES.
1. From Ogdensburgh to Boston......	406
2. From Burlington "	248
3. From Albany "	200

Side by side of which must be considered the peculiar water navigation of each route. Both at Ogdensburgh and at Burlington a break of bulk will be avoided, one transfer of the cargo from the propeller to the railway being incident to each. Both at Buffalo and at Oswego the cargo is divided among smaller craft again to be re-handled in order to be put on the railway. It is contended that the less distance of railway carriage (158 miles) gives Burlington an immense advantage over Ogdensburgh, and the one transhipment an equal preëminence over Buffalo and Oswego.

I am aware that there is great difference of opinion with regard to this matter, accordingly I have endeavored to present both sides of the argument. Many public men* to whose opinions I attach great weight have implicit faith in the project, and consider it the first necessity of the many improvements. Such as these also affirm that even with the present dimensions of the Whitehall Canal, the New York trade would pass by the Lake Champlain route. The reasoning is parallel with that urged in regard to the New England States. That is to say, the greater bulk of cargo will admit of the longer distance. We must bear in mind that from Oswego there is 170 miles of Canal to Albany, and that before the 67 miles of the Whitehall Canal be reached 300 additional miles of navigation have to be passed over, of which 60 miles would be canal navigation, and that equally the bulk of the propellers' cargo must be broken at the end of both routes.

I must say that to my mind the advantage lies on the side of Oswego to such an extent that very little trade would seek Lake Champlain.

If this reasoning be correct it follows

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* Prominent in this class are the Hon. John Young and Mr. Walter Shanly, M.P.P. I have particularly to acknowledge very many obligations to Mr. Shanly—whom I have had the pleasure of knowing intimately for a quarter of a century—in the composition of this work. I am quite free to confess that it is with considerable diffidence I venture to dissent from men, who in every respect are capable of judging concerning the inland trade. Both have studied the subject very closely for many years, and each brings to the enquiry a wide range of mind, absence from prejudice, and the purest desire to attain the truth.

In a letter to me in February last Mr. Shanly says :—

"It has always struck me as wonderful how little our great natural water ways "have been used, and how completely as commercial highways they have been "belittled in value by the Erie Canal; which some people will still affect to despise "and call the 'Erie ditch.' Nevertheless I cannot help thinking that nature has "constituted these great waters for a purpose, and the future will shew what and "how great that purpose is. The Erie Canal gathers a revenue of $5,000,000, while "our magnificent river with all its costly improvements scarce casts its mite into the "treasury. With Corydon we may say :

"*Alba ligustra cadent vaccinia nigra leguntur.*

"However there must be a limit somewhere to the Erie; and some people think "that that capacity is nearly reached already. The very supply of water can be "exhausted, for it is exhaustible, and at this moment great expense is incurred in "husbanding it.

"But if the grain storehouses of the west, filled to overflowing, like water in a "mill dam, ever burst forth as an avalanche, and by the impetus of necessity follow "new routes, and thus under the impulse of a natural law seek a natural channel, "they will then follow the Saint Lawrence as naturally as the waters from the lake "flow through it. The expansion of trade on this continent seems to be illimitable."

1. That until the Whitehall Canal is enlarged, the preferable channel from the upper Lakes to Albany is, in ordinary circumstances, by Oswego.

2. That there is no ground to hope that the Whitehall Canal will be improved, and that in such a case competition with the Erie Canal is an impossibility * .

3. That the balance of probability is not in favor of the supposition, that the grain freights to the Eastern States will take the Caughnawaga Canal to Burlington. Therefore that the canal would be at the best, an experiment made at the cost of four millions, and concerning which opinion is much divided.

II. It would therefore seem that the project possesses no positive and assured result beyond extending facilities to the Ottawa trade for New York and Boston. That it is desirable to have as direct a route as possible is a commercial axiom. But would the country in its present condition be justified in expending $4,000,000 to save at the most a couple of days to the vessels engaged in this trade. For the limit of the Whitehall Canal would still control the tonnage of vessels passing through it. All the lines pointed out have solid advantages, and much can be said in favor of nearly every location. Perhaps the route with a navigable feeder from the Beauharnois Canal with its special terminus at Caughnawaga may claim the preference. For evidently to lock down the difference of level between the River at

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* I advance this opinion on the ground of the great cost of the work, and the influence which western New York would bring against the project. I do not say that the vote of the State Legislature to carry out this improvement would be the death warrant to the prosperity of Buffalo and Oswego, but it would most certainly injure them materially by changing the direction of the lake grain trade. On the other hand the cities on the line of the Erie Canal, Rochester, Rome, &c., would perhaps be favorable to the scheme, as it would remove the pressure from the navigation and accordingly admit of a more rapid passage through it. It now takes 15 days to get a boat through from Buffalo to Albany. My own opinion is, that with locks 250 feet long, 45 feet wide, with 13 feet water, vessels would sail through the Caughnawaga and Whitehall Canals direct from Chicago to Boston, and that the western grain shipper would entirely abandon the Erie Canal. A contingency of this character, and with these results, would awaken an opposition, which at the moment seems insurmountable, more especially as the interests of the city of New York lie in the direction of maintaining the present condition of the trade.

Caughnawaga, and at Montreal again to lock up to the level of the Champlain Canal can hardly be commended.

The difference in distance from Lake Saint Louis to Saint John's would be 16.25 miles in its favor, viz:

To cross River......................	2 miles.
Distance by the Lachine Canal	8.5 "
Across River at Montreal	3 "
By Canal from Longueil	28.25 "
Total..................	41.75 miles.

Caughnawaga Canal, being to the same point 25.5 miles.

This subject has been entered into at some length in detail, as it will doubtless again become a topic of public discussion.

THE RIDEAU CANAL SYSTEM.

The Rideau Canal System has for its object the connection of Montreal by the waters of the Ottawa, with Kingston at Lake Ontario. It is composed of the following Canals.

1. The Lachine Canal which, belonging to the Saint Lawrence Canals, will be described hereafter.

2. The Saint Anne's Lock and Dam.

This Lock is 190 feet × 45 feet, with a lift of 3.6 feet.

Vessels drawing 5 feet 6 inches of water can now pass to Point Fortune at ordinary low water.

3. The Grenville and Carillon Canals, which are three in number to overcome the rapids, between Carillon and Grenville, viz.:—

a. Carillon Canal, 2.9 miles with 3 locks—128 × 32.6 ft.

b. Chute à Blondeau, with 1 lock—128 × 32.6 feet.

c. Grenville Canal, 5.78 miles with 7 locks of the following dimensions:—

Four from 131⅔ to 129½ feet in length × 32½ feet.
Three from 108½ to 106¾ feet in length × 19½ feet.

The capacity of the whole route is limited to the latter dimensions by these three locks.

4. The Rideau Canal passing by the Rideau River and a series of lakes to the Cataraqui River, and having an outlet at Kingston. It has 47 locks 134 × 32 feet, on a distance of 132¾ miles.

These Canals were constructed in the primary view of the defence of the Province. Commercially, the completion of the Saint Lawrence route, at once made them unimportant. They were long held by the Imperial Government, and were only transferred to the Provincial Executive in 1856. The total revenue from all sources in 1863 was $16,025.86. The expenses are given as follows in the Report of the Commissioner of Public Works, 1863.

SAINT ANNE'S LOCK.

Management	$464 82	
Repairs	72 52	
		$537 34

The tolls collected at this lock in addition to the above sum are stated at $5,013 64

CARILLON AND GRENVILLE CANALS.

Management, 1863	$4,105 24	
Repairs	4,935 54	
		$9,040 78

RIDEAU CANAL.

Cost of Maintaining Navigation, 1863	22,231 99
	$31,810 11

A return shews this cost to have been

During 1858	$44,021 45
" 1859	24,848 64
" 1860	22,902 04
" 1861	29,324 43
" 1862	57,852 00

The necessity of this Canal for defensive purposes was suggested during the war of 1812, '13, '14, when the difficulty of communication by the Saint Lawrence in the face of an enemy was often great. Various explorations were made in the succeeding ten years with this result in view, but the work was really not begun until 1826, under Col. By of the Royal Engineers. The date, 21st September, is assigned, and it may be remarked, that the foundation stone of the locks at Ottawa was laid by Sir John Franklin. The Imperial Government undertook the cost, the direction of the works having been confided to the Royal Engineers. It is possible that the smallness of the original estimates may have led the British Government to undertake the expense, £169,000,* but it is wonderful how any such estimate could have been accepted. The estimate was for 160 miles of Canal through a wilderness, with regular cuts and embankments to cost about £1,000 a mile! Taking the Welland Canal as a guide, so constructed, it would have cost many millions of dollars. It consequently appears an unfounded complaint that the tow-path was abandoned, although such complaint has frequently been made. The design of the Rideau Canal was in reality such, that a tow-path was an impossibility. The theory was to utilize the many lakes which

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* Much information on the construction of the Rideau Canal is contained in a work published by Colhurn in 1829—"Three years in Canada." The author, Mr. John McTaggart, was selected by Mr. Rennie, at the request of the British Government, to furnish a Clerk of the Works for the Rideau Canal. In 1828 he returned to England suffering "from the malaria of the swampy wastes," and he published his reminiscences in two volumes. Speaking of the original estimate of £169,000, Mr. McTaggart estimated that the Canal must cost three times that sum. He says:—
"Had the original line of the Rideau Canal been followed the line from whence the
"estimate £169,000 is deduced, I will undertake to point out five miles of it
"which alone would swallow the whole of the estimate; and will even venture to
"state that if that route, which was chiefly cutting through a rocky wilderness, had
"been adopted, it would almost have exhausted the British Treasury. It is a great
"satisfaction to me, that by a concurrence of circumstances, I became one of those
"persons who discovered the injurious scheme into which my country was about to
"be dragged, and in some measure contributed to preserve science from abuse,
"character from destruction, and government from an enormous expense."

The following, which occurs in Mr. McTaggart's official report to Colonel By, is worth preserving as an original mode of constructing an aqueduct over a swamp. The practical result of the scheme has however yet to be tried:—

"I proceed to explain the method which seems to me the most practicable for lie directly back of Kingston, in the Counties of Leeds and Frontenac, and by dams to raise the water sufficiently high so that navigation could be effected. The locks were originally laid out the size of the Lachine Canal, at that date 100 × 20 feet, but they were subsequently enlarged to 133 × 33 feet, in both cases the depth being the same—5.6 inches—and the number 47. The object of the change was to admit the passage of steamboats, a most important introduction which we owe to Sir James Kempt and to Colonel By. Where the lakes and rivers admit of navigation they are used. In the case of rapids, a dam at the base creates a lift to be overcome by lockage; and where no natural connection existed one was made. The rapid thus becomes still water and in some instances a dam not more than 24 feet high and 180 feet wide created quiet waters for a distance of more than 20 miles. Undoubtedly this mode of construction drowned many hundreds of acres of land. But most of it, under favorable circumstances, could not perhaps have been drained, and has never been held to be of any value.

The upper of these series of lakes, the Rideau, is 292 feet above the ordinary level of the Ottawa River at the outlet of the Canal. At the outlet from the Narrows the distance is 83½ miles from Ottawa. The Report of the

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crossing the swamp, although in so doing I may incur a little ridicule. The plan so far as I am aware is new, and has never been tried before, but the situation of the place and many other circumstances justify the method proposed. At first view one would suppose that a mound of earth might be formed to carry the Canal over, or that an embankment of thirty-four feet, with another smaller one at the ridge of the swamp of sixteen feet, would answer well and form an extensive sheet of water for boats to rest, and pass one another between them; but after considering a little we find that to raise such embankments would be no easy matter, and would consume much money. An aqueduct of wood would be much better, and an aqueduct of wood I propose. Instead, however, of supporting them on piles or arches, as is the case commonly, I propose that the heads of the cedar trees, which grow as thickly in the swamp as they possibly can grow, and average fourteen inches thick, and seventy feet high, be sawn off to the proper level, on the route of the Canal, so as to form props for the bottom, sides and towing path upon this foundation, with clay, puddle and planking. I consider there can be little difficulty in carrying the Canal over, as is shewn in the design. A cedar tree, when cut down, will remain fresh for fifty years; and surely a tree standing on and fixed by its roots is a stronger and steadier support for an aqueduct than any pile of the height requisite, be it done in the best manner possible. Nevertheless, the idea of carrying a Canal over the trees in Canada may raise the laugh against us."

Commissioner of Public Works, 1861, states that in this distance there are seven stone dams, varying from 200 to 548 feet in length, and from 5 to 29 feet in height, and eleven wooden and clay dams—cross and longitudinal—varying from 108 to 1616 feet in length, and from 6 to 45 feet in height.

The following is the Lockage to the summit.

At Ottawa	8	locks.
" Hartwell's	2	"
" Long Island	3	"
" Smith's Falls	3	"
Detached	17	"
Total	33	locks.

The Lockage to the Level of Lake Ontario, 164 feet, is,

Four miles from the Narrows	1	lock.
Jones' Falls	3	locks.
Brewer's Mills	2	"
Kingston Mills	3	"
Detached	5	"
Total	14	locks.

The first lock from the Narrows is 43½ miles from Kingston.

In this distance there are four stone dams from 130 to 300 feet in length, and from 16 to 60 feet high, and two wooden and clay dams.

On the line there are the following water and regulating weirs.

Between Ottawa and the Summit, of which number 6 are of stone	16
Between the Summit and Lake Ontario, of which number 3 are of stone	8
	24

The length of Canal Connection on the whole is 8½ miles.

The estimate of this work is stated by Mr. Mactaggert to have been £486,060 sterling. Its cost is generally given as something about £1,000,000 sterling. I can find no authority for stating it exactly.

It is now urged that although this mode of constructing the Canal was economical in point of original outlay, a heavy expense is exacted to retain proper control of the large bodies of water collected and maintained by artificial works, the failure of any one of which causes an impediment in the navigation, and a large expenditure to replace. An instance is adduced in the dam and weir at Long Island, which were swept away by a freshet in 1858. It took two months to reconstruct this work at a cost of $20,667.41. The works which failed were the third which had been constructed since the Canal opened.

The distance from Ottawa to Kingston is :

From Ottawa to the Narrows.........	83¼
From the Narrows to the first descending lock......................	4
From thence to Kingston Mills........	39½
From Kingston Mills to Kingston	6
	132¾

The value of the Rideau Canal is to keep open a water communication between Montreal and Lake Ontario in the time of war, should it ever unhappily arise with the United States. The size of the Locks on the Grenville Canal, three in number, 106.9 ft. × 19.6 ft. would impede the passage of gunboats. But troops and munitions could regularly be forwarded ; and were these locks enlarged, a boat clearing 127 ft. × 32 ft. drawing 5 ft. of water could pass the whole route.

The limit of the Rideau Canal is a draft of 5 ft.

This Canal, in 1848, was navigated from the 17th April to 30th November.

The average period of navigation may be roughly stated from 25th April to 25th November.

CARILLON AND GRENVILLE CANALS.

Starting at Carillon and going westwardly the Carillon Canal first occurs. It is 2.9 miles in length, and is fed from a tributary stream, the North River, and frequently in August and September the supply of water is insufficient. At its lower entrance the Canal is 26 ft. above the Ottawa, which is ascended by two locks; and at its upper entrance descends 13 ft. to the level of the Ottawa, above the Rapids, which this Canal is constructed to avoid. There is accordingly 26 feet more lockage than if the waters of the Ottawa had been used.

The locks are 128 ft. × 32.6 ft.

3.65 miles of navigation of the Ottawa succeed when we come to the lock at

CHUTE A BLONDEAU.

The Canal here is 0.16 miles in length, with 1 lock of 3.6 ft. lift.

The size of the lock is 128 ft. × 32.6 ft.

One mile of Ottawa navigation follows and we reach the

GRENVILLE CANAL.

The length is 5.78 miles with seven locks.

4 locking up........................ 32½ ft.
3 " .... 13½ ft.
46 ft.

The object is to overcome the Longue Sault, which descends this height in the 5.78 miles. It is here that the three locks occur which limit the navigation of these Canals.

4 vary from..... 31⅔ ft. to 129½ ft. × 32¼ ft.
3 " .....108½ ft. to 106⅔ ft. × 19¼ ft.

The extreme dimensions of a vessel capable of passing through the Grenville Locks, are: length, 96 ft., width, 19 ft., draft, 4½ ft.

The maintenance of these Canals is of some importance to Ottawa, and a class of propellers is specially constructed to navigate them. For the last quarter of a century they have not been used for passengers. The Steamer "Lady Simpson" which performed this branch of the trade, landing her passengers at Carillon, and on the opposite shore, Point Fortune, whence they were taken in stages on both sides of the river; to Grenville on the North, and to L'Orignal on the South Shore. Within the last ten years a railway has been built from Carillon to Grenville which has extended this accommodation; a line which was not built specially for this duty, but which was constructed as the commencement of the North Shore Railway between Bytown and Montreal. The work did not proceed beyond this distance from the failure of the resources of the Company. A steamer suited to the upper navigation plies between Grenville and Ottawa.

These Canals are generally opened from the 25th April to 30th November.

ST. ANNE'S LOCK AND DAM.

This lock is 190 ft. × 45 ft. with a lift of 3 ft. 6 inches. It was constructed to escape the celebrated rapids of which Moore sang. The "Row Brothers Row" of the poet is a creation suggested by this spot. Between extreme high and low water at this place there is a variation of 9.5 ft. So what is a turbulent rapid in May and June, later in the season is merely a swift stream. Vessels drawing 5 ft. 6 in. of water can pass above and below the rapid at the lowest level. This lock was begun in Autumn, 1839, but not completed until June, 1843.

In 1849 it was open from 20th April to 6th December. Is is generally navigable from the last week in April to the last week in November.

THE SAINT LAWRENCE CANALS.

These very important works, the links which connect the Western Lakes through the Saint Lawrence with the seaboard at Montreal, are as follows:—

					FEET.		MILES.
1	The Lachine Canal	5	locks,	mean rise	44¾.	Length	8½
2	The Beauharnois "	9	"	"	82½	"	11¼
3	The Cornwall "	6	"	"	48	"	11½
4 Williamsburg.	Farren's Point	1	"	"	4	"	¾
	Rapide Plat	2	"	"	11½	"	3¾
	Iroquois.. Junction.. Gallops...	3	"	"	15¾	"	7⅝
							43⅜
	Including for comparison the Welland Canal,	27	"	"	330	"	28

Fall on portions of the Saint Lawrence not requiring locks......	15¾
Height of Lake Erie above Montreal Harbour................	551¾
Add for difference of level between Montreal and tide water, Three Rivers.......................	12¾
Difference of level between tide water and Lake Erie	564½ feet.

The size of the locks of all the Canals between Montreal and Lake Ontario is 200 ft. × 45 ft., with 9 ft. water on the sills. Cornwall Canal is the exception, being 54 ft. wide at the surface; but in the lower level the dimensions are contracted to a width of 42 feet.

The Welland Canal from Port Dalhousie to St. Catherines has three locks—200 ft. × 45 ft., wi'h 10 ft. water on sills; and the entrance locks of the main Canal at Port Colborne, and of the feeder at Port Maitland has each a length 200 feet with a width of 45 feet. The remainder are 150 feet by 26 ft. 6 in., with 10 feet water on sills. Thus it is evident while the Saint Lawrence Canals proper can pass vessels of greater tonnage capacity than those which can navigate the Welland, that the latter having one foot more draught must be lightened to that extent before they can pass through the Saint Lawrence Canals.

THE LACHINE CANAL.

This Canal was constructed to pass the Sault Saint Louis, better known as the Lachine Rapids. It is 8½ miles long, with a rise of 44¾ ft. The two lower locks, with the basin between them are adapted to vessels drawing 16 ft. of water. The three upper locks have 9 ft. of water on the sills. The earliest date of the opening of the navigation occurred in 1839, on the 11th April, when the Canal was navigable until 23rd November. In 1852 it was open until the 16th December. The maximum number of days navigable was in 1849, when it was open 234 days, from 21st of April to 10th December. The average number of days may be mentioned at from 210 to 220 days. As a rule the navigation may be counted from the last week in April to the last week in November.

This Canal was, perhaps, the earliest great work proposed after the conquest, and its necessity was advocated before the passage of the Constitutional Act in 1791. A bill to carry out the project was introduced by one of the members for Montreal, in the first parliament which held its session under that act, and which commenced in December of the following year. It did not pass, as the resources of the Province were not considered equal to the undertaking. In 1815, however, the exigencies of the war in the transport of munitions led the Governor General Sir George Prevost to recommend its execution, and an act of the Legislature was passed appropriating £25,000 in aid of its construction, while at the same time, special legislation in its favor was resorted to. Peace came and no further effort was made. In 1819, in answer to a petition from parties in Montreal, a Joint Stock Company was chartered, and stock to the extent of £150,000, to be raised by £50 shares, was authorised. This scheme failed; but in 1821 an act was passed by consent, that the subscribers should abandon their rights on receiving back their money, and that the work should be undertaken by the Province.

A contribution of £10,000 was made by the Imperial Government, on condition that all military stores should be toll free. The work was commenced 17th July, 1821, and was completed in 1825. The original intention was, that a branch should be taken to the foot of the current, but this design although often revived has not been carried out.

The original Canal was 28 feet at the bottom, 48 feet at the water line, with 5 feet depth of water throughout. The locks, six in number, were 100 ft. × 20 ft., and were substantially built of stone. At the time of its construction, it was more extended as to breadth, depth of water, length and breadth of locks, than any Canal in Great Britain, excepting the Caledonia and the Forth and Clyde Canals.

The present enlarged Canal arose out of the policy of the Imperial Government, in uniting the two Canadas, in 1840. It was evident that the first step towards carrying out that intention, would be to remedy the deficiencies of the Saint

Lawrence, and make it a highway for travel and transport. The Cornwall Canal had been commenced some years, and although at the surface its locks are 54 feet wide between the gate piers, the capacity is determined by the lower level which from an excessive *bâtir* with a torus moulding superadded, will only admit paddle-wheel vessels of 49 feet breadth of beam, But the basis of the new lock was established by the dimensions of the bottom of the Cornwall lock, which is only 42 feet, the width observed in the other Canals. A quarter of a century ago propellers were not in use, and the exigencies of navigation were determined by the steamboat. The new lock having just sufficient *bâtir* for construction purposes, with a width of 45 feet at the surface, will admit a steam vessel of 5 feet less width of beam than the Cornwall locks can receive. On the other hand, the length of the Cornwall lock was quite disproportionate to this additional accommodation of width, and as no increase could be given to existing structures in this respect, the present proportions were adapted to it, as the best that could be determined. This established limit was observed to the east of Lake Ontario.

During the alteration, the navigation was not discontinued. The new locks were constructed by the side of the old ones in the summer months. The deepening of the bottom and the enlargement of capacity were carried on after the close of the navigation. Where practicable the Canal itself was straightened and improved. The present width is 80 feet at bottom and 120 feet at top, so that two vessels can pass in any point of its waters.

The Lachine Canal was sufficiently enlarged to its present capacity, in the Spring of 1848, to allow the passage o vessels.

It was not until May, 1862, that the Canal was excavated to the full width. The formation from Lachine, some two miles or so inland, is the base of the Silurian groups, to cut through which, was a labor prolonged and expensive. The narrowest part of this cut is 1 0 feet in width, and it is pronounced the finest portion of the Saint Lawrence Canals.

The cost of management, 1863, amounted to...	$11,391.14
Repairs and maintenance.................. ..	9,608.10
Total.............................	$20,999.24

It is officially asserted, that the expenditure for repairs and maintenance is much larger on this, than the other Canals. The mill sites sold by the government, and which are now worked, take so great a supply of water that a strong current runs throughout its length. The same results consequently occur as arise in natural rivers. The banks are washed in spite of their protection walls, and bars are formed in the channels and basins. The dredging machine is accordingly in constant requisition. The greatest annoyance is the impediment caused to the navigation; vessels frequently become unmanageable.

The cost of maintenance, repairs and management is given as follows:—

1852	Not given.
1853	"
1854	$18,293.00
1855	32,313.53
1856	26,374.47
1857	33,660.26
1858	22,607.62
1859	20,673.36
1860	28,095.04
1861	23,022.15
1862	22,993.73
1863	20,999.24
Total for ten years	$249,032.40
Adding for 1852 and 1853......	36,500.00
Total from 1852 to 1863.........	$285,532.40

It is not possible to give the exact amount expended on this Canal or indeed any of the Canals.* All that can be done is to attempt an approximation. I would therefore submit the following figures as representing fairly, and without perversion, the total cost of the first construction, and the subsequent enlargement to the present capacity.

The total amount expended up to December, 1863, by the Department of Public Works since the Union	$2,116,902.38
Amount expended by the Lower Canada Executive before the Union............	398,404.15
	$2,515,306.53
Deducting 12 years maintenance, repairs and renewals from 1851 to 1863	285,532.40
	$2,229,774.13

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* I have had considerable difficulty in satisfying my mind as to the figures, which will rightly show the proper cost of the Canals. There are two sources of information the Public Accounts and the Public Works Reports; but it is very evident that in these schedules no distinction has been made between construction proper, and maintenance. Under the head of assets in the Public Accounts, (1863,) for instance, in page 1 the Saint Lawrence Canals appear as an item of value, having cost $7,389,994.38. In 1860 they appear as $7,212,656.06. So it may be inferred that the primitive rule is observed, that every expenditure, be its character what it may, or under whatsoever circumstances it has been incurred, is charged to the account of a particular work as the voucher has shewn. The principle is manifestly incorrect. The annual maintenance and management are necessary annual charges; they are items of a specific outlay which cannot be considered to increase the capital invested in a work. Accordingly the so called asset in no way represents its true and proper value. It would certainly repay the expense in the information it would furnish, if the accounts were carefully examined from the very commencement of the expenditure by an experienced accountant, and the legitimate construction cost determined. I have taken the accounts of 1851-2 as the basis of my estimate, believing that these figures will as fairly represent the true capital account, as it is possible to attain, without a thorough examination of the vouchers. I except the Junction Canal, which I date at 1858. My reason for this course is, that although there is the annual charge of management and of repairs to be considered in the years which intervened between the opening of the canals and this date, much of the work during this time was rather a completion of new work, than the renewal and restoration of old. For it had only just been completed. There was however the cost of management, superintendent, lockmasters, bridge-tenders, &c., which ought, properly speaking, to be deducted. On the other hand much extra work has been done within the last twelve years which ought to be included in the total of construction. As an approximation these two items may be considered to cancel each other; and in this view, the amounts of that date may be taken, if not as the exact sum, as a very close and fair approximation. I feel it proper to say, that I present the figures which I give only with this view. The misfortune is, that no closer accuracy can be attained.

The information given in the Public Works Reports, is neither satisfactory nor exact. It is not compiled with care, and without the aid of the schedules in the

THE BEAUHARNOIS CANAL.

The Beauharnois Canal succeeded as a consequence in the improvement of the navigation. Its length is 11½ miles, with 9 locks to overcome 82½ feet of level. Its outlet at Beauharnois in Lake Saint Louis is distant about nineteen

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Public Accounts, is imperfect. In some instances the figures lead to wrong conclusions. In the Report, 1863, the cost of the Welland Canal, page 12, is stated at $7,293,248.89. In the Schedules of expenditure, Appendix A, under the column, "Total expenditure on construction to 1st January, 1864," the amount is stated as $4,756,460.70. Possibly there is a saving clause in the heading, in the words "under this department," and it may be said that the amount only represents the cost of the work since the Union. On reference to the previous page such would seem to be the case. The same with regard to the Chambly Canal, which is set down at $69,774.51. As a rule, what is needed for general purposes, is the total cost of any work, although it is proper to retain the history of its expenditure, as to a certain degree it is the history of the consummated project, and in that sense has its significance, and suggestiveness. No such proceeding is even attempted. The Public Accounts of 1863 give the Chambly Canal and River Richelieu as an asset $433,807.83. The Board of Works Report, 1849, estimates the Chambly Canal alone as more than that sum. The value of the two I would set down as

Saint Ours Lock	$144,533.79
Chambly Canal	480,816.00
	$625,349.79

There is also under the head of Saint Lawrence Canals, an item utterly incomprehensible. It is called General Expenditure, and appears from year to year. In 1863 it amounted to $74,835.20. I can find no explanation of its meaning. All inquiry is imperfect from the want of statements in detail of the annual cost of repairs, maintenance and renewals—with the charges for management—for all the Canals placed side by side for the purpose of comparison.

This expenditure is now entered in the Public Accounts in the gross and is taken into consideration as a charge against revenue; nevertheless it is still added to the cost of each work to increase the value of the asset. What is needed in the Public Works Reports is the explanatory detail necessarily not given in the Public Accounts. Unless under peculiar circumstances, the average amount should be the same for a period of five years for instance; and where it was increased, the extraordinary circumstances by which additional expense had been caused, should be stated in full in order that the disbursement could be fairly judged.

In the Report of Public Works, 1858, such information is satisfactorily given with regard to the Welland Canal, shewing the cost in detail for management, and for maintenance and repairs. These schedules prove that the accounts can be properly kept, and similar details ought annually to be given, retaining the total expenditure for the preceeding ten years. Where there is a legitimate increase to capital in the shape of new works and any immediate consequent damage, it should be so considered and be charged to capital. On the other hand all expense arising from accidents, or special, natural, unforeseen causes, are clearly contingencies and are chargeable against revenue.

To turn from the Board of Works Schedules to those of the Tables of Trade and Navigation, and the Public Accounts, is positively passing from darkness to light. The information is succinct, plain and easy of reference. It is however a matter of regret that the system of closing the year on the 31st December has been abandoned. The Reports which have been sent down last session of parliament only give the statistics to 30th June. The reason adduced is the necessarily late period of the session before Reports are presented to parliament, when the official year closes with December. It is desirable certainly that all Reports be laid on the table printed and ready for distribution as soon as possible after the address to the Throne is voted; but this convenience is dearly purchased if the information be indistinct and insufficient. The termination of our commercial year in every respect ends with the miles of navigable water from the entrance of the Lachine Canal, and accordingly it connects the above Lake with Lake St. Francis. The impediments overcome are the well known "Cascades," "Cedars," and "Coteau" Rapids. Between these several interruptions to the navigation, there are

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December of the Calendar. Its seasons are distinctly defined. The Saint Lawrence Canals close generally the last week in November, and the Welland Canal, at the latest, the 15th December. The instances when a vessel has sailed for sea from Quebec after the 1st December are rare indeed. All the public works have long previously been brought to a close; and if there be any specially carried on, the estimate of the 30th November is the last given in the year, and certainly the last paid. Here lies the bulk of the information to be condensed and classified. The departments not connected with these events generally have to deal only with routine information, which for all practical purposes could be put in tabular statements as well on the 1st December as on the 1st February; and any alterations springing from extraordinaries might be introduced with ease in the final reports. Even the Public Accounts are taken from schedules, the contents of which may be anticipated. One simple regulation with regard to them would remove all difficulty, viz., that no payments should be made after a certain day in December, the 10th or 15th. I cannot put my hand on the authority, but I believe that I am justified in saying that the Treasury at London is in possession of all statistics affecting that department in a very few hours after the close of the year, a fact theoretically quite possible when we take into consideration the aid of railways and the telegraph. It is true that the United States close the official year on the 30th June, but the case is in no way parallel with our year, and no guide for us to follow. The United States are of immense extent, with territories demanding special legislation thousands of miles away from Washington, without railways or telegraphs, and the very geographical difficulties are such, that it is impossible to gather the information under a certain number of days. Canada in this respect ~~is the~~ reverse. Although of great longitudinal extent, transversely it is very limited, and throughout it is compact and connected by lines of railways, and at all points within reach of the telegraph. Gaspe and the adjoining district may be excepted; but the secondary importance of the locality admit of statements made up to a given day in December, in order that their delivery in Quebec by the 31st be assured, the few after entries being carried to the following year. All the canal reports can be posted for Quebec by the 15th December, and all trade returns by the 3rd or 4th January. Besides, Congress meets on the 1st December, while the Canadian Legislature rarely begins business until the 1st Feb., certainly two months later. Accordingly there is no reason at all why the public accounts should not be made up by the 10th or 15th January. The question of audit and printing is equally free from difficulty, for the examination of the former proceeds *pari passu* with the compiler's labors during the year, or at least they ought to do so, and with moderate energy the accounts ought to be presented to Parliament early in February. The mechanical question of printing, I do not even consider, as it is a matter of hours. If accounts were laid on the table of Parliament by the 15th February, it would be in ample time for public business. But as the accounts now close on the 30th June, for statistical purposes they will be valueless unless the two half years are kept perfectly distinct. Otherwise we have two halves of two different seasons, forming an incongruous whole. The Executive should have had the courage to resist the demand for this innovation, and they should at once return to the old system. The reform should have been in hastening the completion of returns, not in changing the mode in which they were prepared. As a rule, Canadian Blue Books are rarely studied, if we may judge by public indications of the fact. Honestly compiled they are guides for the future. But the politician seldom rises above the emergencies of the moment, and can rarely comprehend the full bearing of a measure for good or for evil. Were it otherwise, there would be forethought given to legislation, and more resistance shewn to unprofitable schemes, and more courage in withstanding the objects and aims of personal interest. The ties of party are held in higher account than duty and foresight; and it too often happens that conviction and feeling are sacrificed to reaches of still water, and it would not have been impossible to have constructed three separate small canals, and to have passed to the quiet water and abandoned the river where it ceased. But such plans for an incomplete result really save little money, and give imperfect satisfaction, from the impediments and delays in navigation which they fail to remove. This Canal, thrown at once across the land, and in one work overcoming all the obstacles to be dealt with, may be adduced as an example of successful engineering of the more enlarged school. Great difficulty was experienced in obtaining a satisfactory navigation to the upper entrance. The current was very strong, and a shoal lay across the

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the selfish energy of cliques of imperfectly informed, restless men, who never swerve one moment from thoughts of personal ambition and advantage, but nevertheless have always in the mouth high sounding words of patriotism and liberality. The true resources of a country are seldom considered and consulted by such as these. When wise legislation is effected, it is rarely by the spontaneous effort of politicians. It is the irresistible pressure from without which achieves progress. The truth known, felt and urged by the intelligence of the great body of the people demands and exacts recognition, and those who before have denied it a word, or an effort, cowed by the demonstration, battle to become identified with an improvement which they have withstood, and as far as they were able ridiculed.

The public indifference regarding these documents has reduced them to a mere matter of form. As a theory they present a detail of the working of each department of a system of government, which in questions of expediency and legislation must be taken as a whole. The information they contain ought to be precise, well digested, and ready to the hand. They should in themselves form a check on the proceedings of an administration, and should set forth every individual event by which its wisdom and policy can be judged. The extent to which this result is not attained only those who study Blue Books know. In one respect at least, hitherto they have wisely been kept, without destroying the natural commercial cycle. The new method of accounts, of which the first number has been issued has set aside a system both natural and judicious; a change so ill advised, and unnecessary, so calculated to lead to incomplete and unsatisfactory information that it is to be hoped it will not be persevered in.

I append the remarks on this subject, which appear in the Public Accounts, 1862, both as an act of justice to the gentlemen whose names are subscribed, and as in my judgment they bear out the views which I have expressed. It is evident, that by the adoption of the suggestions which they make, and with a determined effort on the part of deputy heads of Departments, the natural year can be perfectly well kept as the commercial and financial year. The subject is one, concerning which public opinion should be unmistakably expressed.

" The constantly increasing business of the Department makes it annually more " difficult to collect at an early period of the year, the returns of the several subor- " dinate accountants, and to combine the whole of them into the Public Accounts, " to be submitted to Parliament. We do not think that under the most favorable " circumstances it will be possible to present them to the Legislature before the " middle of March; whilst unforeseen delays are always liable to occur, which may " retard their completion even beyond that period. At the same time, there appears " to be a growing desire in the country for an earlier meeting of Parliament, and " the consequence would be, that almost all financial questions must necessarily be " postponed till near the close of the Session. It may be worth while, under these " circumstances, to consider whether the inconvenience may not be remedied by a entrance; consequently the channel was extremely crooked, and vessels going upwards could barely steer through it. An attempt was made to remove the impediment by dredging, but the swiftness of the current, and the hardness of the material made the process very slow ; and further to impede the operation, there were huge boulders imbedded in the hard gravel, forming very dangerous obstructions. Thus, while the guard lock at the very lowest water level was plentifully supplied with water, having really more than the requirement, the approaches to it were most unsatisfactory. The necessity of a dam was accordingly seen before the completion of the Canal; but although it was held to be indispens-

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" change in the termination of the fiscal year. It would evidently be important " that the financial year should not end until after the close of the navigation, so that " the Trade Returns should shew the whole business of the season ; but this object " would be attained if the 31st of October, or more certainly, if the 30th of November " wore established as the term. We are not aware of any material difficulty " which would arise from such a change. The first year would only consist of eleven " months, but it would include in almost all branches of the receipts and expenditure, a proportionate amount of a year's transactions, with the exception of the " interest on the public debt, which, being principally payable on 30th June, and " 31st December, would appear very much reduced in the first year of the new " system. Any such change should be maturely considered in all its bearings, and " we merely throw out the suggestion as the most obvious way of meeting a growing " difficulty."

" All which is respectfully submitted. John Langton, *Auditor;* R. S. M. Bouchette, *Commissioner of Customs;* Wm. Dickinson, *Acting Deputy Inspector General.*"

In the introductory remarks to the accounts of half-year, 30 June, 1864, Mr' Langton states, that

" One of the main objects of the establishment of the present system of Audit was " that no expenditure of any kind should take place without the sanction of Parliament previously obtained, * * which under the old system was always the " case." * * He thinks " with the existing arrangements, when Parliament " assembles at the usual time, and the supplies are voted for a financial period which " has not yet commenced, there ought to be no difficulty in carrying out the provisions of the Audit Act strictly."

He however admits that the check on the expenditure is only limited. That although " the Auditor is responsible that no accountable warrant or letter of credit " issues for a greater amount than the aggregate sum appropriated to any department; if two or more distinct appropriations are included in that aggregate, the " Department may over-expend upon one of them, without the knowledge of the " Audit Office, until the accounts are rendered."

As a rule, very few new appropriations need in any way to be drawn upon until the first of May. The Civil List is an expenditure which must be met, and there are parallel expenses which arise and have to be paid as a matter of course, to carry on the public works. Generally some little amount remains of old appropriations, to meet contingencies, until a vote is given. And even if it does not so happen in all cases, the creation of an unappropriated balance would admit of the proceeding.

But would not a real control be exercised by the Auditor presenting a special schedule " of payments made without authority of Parliament?" On the other hand, is not this precisely a series of facts, the disclosure which, is often very embarrassing ?

able, yet as no appropriation had been made by parliament, no steps were taken to construct it, until an accident to a steamboat drew public attention to the bad navigation. In 1846, a year after the opening of the Canal, the "Magnet," Captain Sutherland, missed the channel, and striking on one of the boulders was stove in, and sank, where she lay crippled for some weeks. The construction of the dam was then ordered, and the effect of it when finished was to raise the water in the dredged channel about a foot. The dam runs across the south branch of the Saint Lawrence. It was completed in 1849, at a cost of about £6,000; and since its construction there has been, at all times, a sufficient depth of water at the entrance. The existence of this dam however has been made the ground of very heavy claims for damage on both sides of the river extending very far back, some of which are yet unsettled.*

One question was vehemently debated at the time of the commencement of the work, and even now occasionally forms a topic of conversation, viz.: the side of the river on which the Canal should have been constructed. An examination of the criticism may here be profitably made. It has been urged that for military reasons the Canal should have been located on the north shore; that additional security would thus have been obtained for it; that to place it on the south shore was needlessly to expose it to destruction from a hostile force. There is a certain plausibility about this argument which obtains attention. Doubtless where two routes are equally good, the consideration that one is preferable in a military point of view is important; but where two routes are not equally good, the question of military necessity must be weighed just at its value, and must not dominate over greater and more imperious requirements. The danger from an attack on a Canal is two fold. Unless a *reconnaissance* be made in force, and the guard driven away, an assault must be sudden and rapid. In the former instance when a *corps d'armée* of the enemy takes possession of the ground, with plenty of men to mine, and twenty-four hours to do the work, it is evident that the Canal would be entirely destroyed. The rear of the lock recess walls would be mined and simultaneously blown in; the embankments would be opened, at well selected spots, and the water turned over the lower level. The Canal would be annihilated. In this point of view, it is unimportant on what side the Canal were placed, seeing that the only people with whom we can have war would not be deterred by the river from the advance; for the flotilla carrying the troops could pass by the Saint Lawrence itself as the passenger boats do daily. We may eliminate this view at once. The other mode is that of half a dozen men repairing to the Canal, with powder and fuse, and in an hour doing what damage they could. Now, in this case, the damage would be, after all, trifling in such a Canal as the Beauharnois. From its inland position the embankments are heavy, solid and compact. They would be opened with difficulty, and from their height, not being in excess of the depth of water, and being on a level country, even if injury were consummated, a few hours, or at best a day or so, would repair the damage, for the break would be narrow. It is evident that the attack would be on the locks, and here there is no ground for fear that the injury would be serious; for if the walls of a lock were blown in and the gates destroyed—as there are always new gates in store, and plenty of masons—a week would repair the injury. In this view we overrate the result, for we judge such an eventuality by the standard of commercial annoyance. In the interests of commerce, no more serious blow can be given than a stoppage of lines of communication. One of the main Canals closed for forty-eight hours would disarrange the whole trade of the province. In war this commerce would be a matter of shift, necessarily irregular, and often totally impeded. Therefore a few days break in the navigation would not then be so sensibly felt, and except in extreme circumstances would have little effect. Besides, viewing the geographical position of this Canal, is it not as likely that they who would attack it, would descend the Saint Lawrence by boat to do so, as that they would cross some extent of an enemy's territory exposed to arrest every step they took? We must recollect too that the Rideau Canal, expressly constructed by the Imperial Government was in operation at the time; and on the other hand, that the Cornwall Canal on the north shore of the Saint Lawrence, is exposed to a greater degree to such an assault, being within gun-shot of the opposite bank of the River.

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* A popular tradition assigns the erection of the dam to the fault of the engineers in laying out the work. But there is not the least foundation for doing so. As it is a gross injustice to every one concerned, I wish *avec connaissance de cause*, if possible summarily to do away with the imputation. The rumor may have found countenance, from a rather unpleasant *contretemps* in connection with the work, which may thus be briefly stated: In 1842, a gentleman with strong letters of recommendation was appointed to superintend the surveys, and in July of that year, made a report of progress, stating the fall from the head of the Coteau to the foot of the Cascades Rapids to be 104 ft., just 20 ft. more than was recorded in the old plans and surveys. "It was a regular bomb-shell thrown into the department," writes one of my informants. For this difference of level involved two more locks, than were estimated, and was perfectly bewildering. Mr. Killaly proceeded at once to the spot, taking with him Mr. Shanly and Mr. S. Keefor, to run separate test levels, and it was soon proved that the old account was the correct one. Some change was then made in the conduct of the work, and Mr. Mills remained in charge until his transfer to the Williamsburg Canals, when his place was taken by Mr. Shanly.

If any mistake was at all committed, it was in not persevering in dredging the upper channel to Lake Saint Francis, and blasting the boulders in it, and attain twelve or eighteen inches more depth, however expensive the work might have been. The dam gave a supply from six to twelve inches higher level, and yet it has been made the ground of damages of every sort and kind. Upwards of $130,000 have been paid for these claims. Such a God-send seldom enriches a community. It is not every river that feeds so productive a *vache-a-lait*: and there is a tradition, for the history goes back to antiquity, that no member can be elected for Beauharnois, who has unreasonable views on this matter.

Should ever an attack be made it will be on the Cornwall Canal, which from its geographical situation, and from the mode of its construction is sensitive in the extreme to injury. It is no exaggeration to say that it could be destroyed without an American putting his foot on British soil. Were three or four heavy guns set in position on the opposite shore, and directed against the lofty embankment skirting the Longue Sault Rapid, the earthwork would at once be breached, and the canal rendered useless. For an opening wide enough to let out a few gallons of water in works constructed as the Cornwall Canal has been, would, in an incredibly short space of time, be so immense that a torrent would dash through it.

This is not advanced in the spirit of partizanship. Twenty years have passed since the first vessel sailed through this Canal, and the feelings which were engendered by the controversy must long since have died away. But an important principle comes to the surface, and it is this: that commercial exigencies must, with an engineer, prevail over possible military necessities. The normal condition of a people is peace, not war, and the development of its resources must be the first question to be considered. The calculated contingencies of warfare are as often false as true, and the blow as frequently falls where it is unlooked for, as where it is guarded against. The natural position of the Beauharnois Canal is where it is placed. To have taken it on the other side of the river would have been to abandon the pleasant, easy navigation of Lake St. Louis, for the difficulties, intricacies and shoals of the Ottawa, on the opposite shore. The rapids of the Cascades extend below the Junction of the Ottawa with the Saint Lawrence, and the approach to any Canal there would have been expensive to construct, and when constructed not good. Mr. Killaly's choice of ground must therefore be perfectly vindicated.

The scandal ran, at that day, that Mr. Ellis, the proprietor of the Seigniory of Beauharnois, a member of the Imperial Parliament, influenced the then Governor-General, Lord Sydenham, who influenced his President of the Board of Works, Mr. Killaly. The argument above set forth is a fair test of its truth.

The work was commenced in June, 1842, and was completed so that vessels could pass through it in the last days of October, 1845. The first vessel which made the trip was the "Albion," Captain Chambers; the Board of Works was the host on the occasion at an entertainment given to many of the leading merchants of Montreal.

The cost is mentioned in the Public Works Report as $1,331,787.95.

The repairs and management during 1863 cost $14,970.64.

The annual maintenance may be estimated from $6,000 to $7,000.

CORNWALL CANAL.

The distance between the entrance of the Beauharnois and the discharge of the Cornwall Canal is 40 miles of a good and well marked out channel. The Cornwall Canal was constructed to avoid the Longue Sault Rapid. It is 11½ miles long with a rise of 48 feet. It has 6 lift locks and a guard lock. The locks are 54 feet wide between the quoins; but the decreasing capacity in the lower chamber really limits them to paddle-wheel steamers of 49 feet width, and this is 5 feet in excess of the other Canals. The bottom of the lock is 42 feet wide. The Canal has been opened as early as the 7th April. The latest day of navigation has been the 16th December. The general period of Canal service is from the last week in April to the first week in November, from 220 to 230 days.

The cost of the Canal was, before the Union.	$1,448,538 36
" " since the Union......	378,711 26
	$1,827,249 62

The repairs and management in 1863 are mentioned at $12,179 35.

This Canal was the first in the series constructed on the present enlarged scale, and the remaining Canals were regulated according to its dimensions. It was very early seen that all progress in the Western Province depended on communication with the seaboard, and that this connection must be obtained by Canals. The construction of the Lachine Canal necessarily pointed out what ought to be done, even if the difficulties in obtaining supplies and moving troops during the war of 1812, had not enforced some exertion. On the other hand, although the St. Lawrence had been rendered of secondary importance by the construction of the Rideau Canal, its natural advantages were so manifest,* that it was impossible for them to be disregarded. As early as 1825, an address was voted by the House, asking the Lieutenant-Governor to direct the Surveyor-General to furnish a map of the Saint Lawrence in

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*Among the earliest writers on Canadian improvements was Mr. Robert Gourlay, who died in August, 1863, in Edinburgh. His name is quite forgotten now, except by those who were among his persecutors; or if it be at all remembered, it is by the few students of Canadian history, as calling to mind one of the most objectionable proceedings in the Provincial records. Mr. Gourlay was essentially a character to leave alone. He had courage, vanity, love of notoriety and energy. On the other hand he was superficial, destitute of fore-sight, with limited sagacity, and incapable of that steady application by which a subject is mastered. On his arrival in Canada he turned agitator, and the policy would have been, to give him line enough, for his career proved, he was his own worst adviser. His opponents made him a martyr. In 1818, on the ground that Gourlay had not been a resident of the Province for six months, and that he was a seditious person, he was brought within the meaning of a statute passed in 1804—and repealed two years after these events—that he was an alien and ordered to leave the country in ten days. Gourlay was a Scotchman, to call him an alien seemed a blasphemy, and he treated the command with contempt. He was arrested and placed in Niagara Jail, upon which his friends applied for a writ of *habeas corpus*. Chief Justice Powell refused to bail him and remanded him to prison, where he remained many months, in which place the severe treatment he received made him insane, at least so it is said, and the extravagance of much of his after life justifies the opinion. He was finally tried and forced to return to the United States. Such was law and justice in Canada half a century ago. It is a consolation to think that impeachment would at once follow a similar injustice to-day.

Gourlay, when in Niagara Jail in 1819, published a letter in the journals of the day advising the construction of Canals, for the improvement of the Saint Lawrence. They were to admit vessels of 200 tons burden, which equally could cross the ocean, and sail up the lakes. The route recommended for river navigation was to leave the Saint Lawrence above the Longue Sault, and cut into the Ottawa some 70 miles below the rapids on that river. To use his language, "By a bold cut of a few "miles at the first mentioned place the waters of the Saint Lawrence might be con-"ducted to a command of level, which would make the rest of the way practicable "with very ordinary exertion." This specification of his plans gives a fair estimate of Gourlay's want of judgment. Yet he had the sagacity to see the necessity of endeavoring to obtain what the Western Canadian wholesale warehouseman demands to-day, viz: that goods from England should be brought to Upper Canada in the bottoms to which they had been committed. His theory was that every vessel could leave the mother country, proceed to the extremities of Lake Michigan or Superior, and return in ease in a season. That every vessel could leave Lakes Ontario and Erie in the spring, proceed to England, and return to take home a second cargo of produce, to be back at the opening of the navigation.

the Johnstown District—which of course meant the Longue Sault Rapid; and in December, 1826, a report was made to the Lieutenant-Governor, and by him laid before parliament on the 30th of the same month. Consequent upon this information, steps were taken to ascertain the cost of overcoming by artificial navigation the difficulties which impeded travel. Two estimates were given in; one for a Canal 8 feet in depth, 60 feet in width at bottom, and 84 feet at top, with locks 142 feet × 40 feet, to be completed for £166,378 8s. 5d. The second, 4 feet in depth, 26 feet at bottom, and 38 feet at top, the locks to be 100 feet × 15 feet, was estimated at £91,835 1s. 11½d. (*sic.*) The design was not for a continuous canal, but the route was to turn in and out from the river. From this date, there was a party in the Legislature which kept the project steadily in view. The subject came up from time to time in the House; and it was considered that a step was taken in the right direction when Commissioners were appointed to confer with similar Commissioners from Lower Canada. The real impulse came in 1830, from Brockville, which by the construction of the Rideau Canal and the abandonment of the Saint Lawrence had suffered from the change. At this meeting a sum of sixty pounds was subscribed for a survey of the ground, and it was determined to petition the Legislature to carry on the improvement. The petition was presented, and reported upon to the effect, that unless the Legislature of Lower Canada undertook to improve the rapids in that Province, there would be nothing gained by enabling steamboats to go below Prescott. It was therefore proposed that the petitioners should be incorporated into a Company, with a capital of £50,000, which sum, if circumstances warranted, could be extended to £200,000. The whole subject was seriously recommended to Parliament. The question was debated on the 11th March, 1831. It was then resolved that the navigation should be for sloops and steamboats, and the

Lieutenant-Governor was requested to ask permission of the Governor-General, to be allowed to survey, at the cost of the Upper Canada Legislature, the rapids above Lachine. A further resolution, that the permission should be asked with as little delay as possible, was voted. In 1832 a Select Committee was appointed, who reported that a Canal avoiding the Longue Sault rapids would admit steamers to ply from the Province line; and recommending that Commissioners should be directed to obtain an estimate of the cost; and that the sum of £50,000 should be advanced to the Commissioners "to commence the work at the Longue Sault" when they had obtained their information. Following this report a resolution was introduced into the House that the public interests required that the Saint Lawrence should be improved so as to admit of navigation by vessels drawing 8 feet of water, and that the improvement should be commenced as soon as practicable at the head of that rapid. Some attempt was made to limit the navigation to 5 feet, but the main proposition was voted by 20 against 6, and £70,000 was appropriated to the work. Three Commissioners were appointed to carry out the project. No time was lost in entering upon the examination. The main difficulties, however, lay in the want of money. The improvements contemplated not only the Cornwall Canal, but also the four Williamsburg Canals, and the gentlemen who assumed the duty performed it in an able, thorough and satisfactory manner: a wide contrast to the neglect, recklessness and ignorance which are revealed in the early records of the Welland. The estimated cost of all these improvements was £328,615.1s. In Dec., 1833, the Commissioners reported that they had caused the necessary surveys to be made, and careful estimates to be prepared, and had made arrangements for the immediate prosecution of the work. This Canal was accordingly commenced in 1834, the first sod having been cut with some ceremony by the late Sir John

Beverley Robinson. It was carried on with energy until the rebellion, when it was temporarily discontinued. It was resumed, with the other public works in 1842, and completed in 1844. The first steamboat which passed through the locks was the "Highlander," Captain Stearns, late in November or early in December, 1842. The occasion was observed with some ceremony. The Canal was opened for traffic on 10th April the following year.

On looking at the location of this Canal one cannot but be struck at the singular want of judgment displayed in it.* In every way it is a striking contrast to that of the Beauharnois. The latter leaves the river bank and strikes boldly for a direct route, curving with a large radius when necessitated to change its course. The former hugs the shore, and curves and winds with it. Some saving may have been made in the cost of the land, but it was a small item compared to the heavy embankments, which this adherence to the river bank necessitated. The consequence is that very serious breaks have taken place which could only be repaired at great cost. Whether this arose from imperfect and careless construction, or from the very nature of the work, it is difficult to say. But the fact is certain, and it is so far suggestive, that no point in the Canal system needs more closely to be watched. In case of war with the United States, a knowledge of this weakness would require that this point should be specially guarded. Some half dozen men with picks and shovels, opening these embankments would, in an hour, inflict an injury which it would take months to repair. No such misfortune could occur in any of our other Canals; and here in a military sense is the weakest point in the whole system ; the more unfortunate, as geographically speaking, no canal is so exposed, and as has before been remarked, it will ever be at the mercy of a judiciously planted piece of heavy ordnance discharged from American soil.

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*This criticism may appear to contradict the respectful mention made of the Government Commissioners, but I do not see that the faults of location can be attributed to them. As the κῦδος obtained through a successful work is by public consent the prerogative of the engineer; on his shoulders only, must blame fall when unhappily it must be expressed.

THE WILLIAMSBURG CANALS.

These Canals were originally four in number, and although contemplated at the time of the commencement of the Cornwall Canal, they were not begun until 1843. They were finished in 1846, 1847.* The first in the series is the Farren's Point Lock, 4.9 miles distant from the Cornwall Canal. It is three-quarters of a mile long with a lift of 4 feet. Ten miles higher, occurs the Rapide Plat Canal, 3.9 miles long, with 11.6 feet lift, on which is a guard and a lift lock.

Four and a half miles higher are the two Upper Canals, united by the Junction, and forming one Canal. It escapes the Galops and Iroquois Rapids. There are two lift locks and a guard lock. The rise is 15.9 feet; the length 7⅝ miles. The distance from the latter to Prescott is 6⅝ miles. These Canals have only 50 feet at bottom. The rapids which they overcome are comparatively slight, and are navigated both ways by passenger steamers; accordingly these Canals are principally used by upward bound freight craft.

The cost of the whole is named at $1,222,904.03.

The Junction Canal was constructed, owing to an error of level in laying the sills of the lock on the lower "Galops" or Iroquois Canal, from which cause an insufficiency of water resulted. It created a good deal of remark in 1848, when it was discovered, and an angry correspondence concerning it was carried on in the Montreal journals. The new Canal raised the level of the reach and remedied the deficiency. The cost of the remedy however was $211,231.33, and the annual charge and maintenance of the new canal for ever.

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* The Report of Public Works, 1847, gives the following dates:—
The Galops Canal was opened in November, 1846.
The Farren's Point " June, 1847.
The Rapide Plat " September, 1847.
The Point Iroquois " October, 1847.
The Junction was so far finished by the fall, 1856, that vessels could pass through it. It was completed the following year.

The repairs and management in 1863 amounted to $9.864 04.

The period of navigation is about similar to that of the Cornwall Canal.

THE WELLAND CANAL.

The Welland Canal connects Lakes Ontario and Erie, carrying the navigation around the rapids and the renowned Falls of Niagara. It is 28 miles in length, with 27 locks, rising to an upper level of 330 feet. The three locks from the outlet at Port Dalhousie, on Lake Ontario, to Saint Catherines, a distance of 4 miles, are 200 ft. × 45 ft., by which means Saint Catherines has been made the head of the Saint Lawrence navigation, and would accordingly claim to be considered in any project of improvement of the Saint Lawrence Canals. The remaining 24 locks are 180 feet × 26.6 feet, except the guard lock at Port Colborne, Lake Erie, which is 240 feet × 45 feet The guard lock to the feeder at Port Maitland is of similar dimensions. The original depth on the sills of the enlarged Canal was nine feet, but as great difficulty was experienced during some years in passing the largest class of deeply laden vessels, it was decided, in 1853, to increase the draught of water to 10 feet. This was effected in that year, by raising and strengthening the banks. The Canal navigation, in 1851, was opened on 25th March, and in 1853 continued open to 17th December. It generally opens the first week in April, and is continued to the first week in December, from 245 to 250 days.

The history of this important work* is so marvellous and so little known, to some extent even so misrepresented, that a consecutive narrative is indispensable, correctly to understand the vicissitudes through which it has passed. So far as the writer knows, no connected account of it exists, and it has to be traced out from official documents, and the records of legislative proceedings. One fact is certain: had not the project been of a character which nothing could destroy, it would long since have irretrievably foundered. This Canal can be adduced as one of the many proofs, how almost impossible it is to destroy that which has inherent vitality. The honor of being its originator has been claimed by many; but it was precisely one of those projects which the situation itself suggests. The earliest settled parts of Western Canada were those easiest of access to the new United States, from which the United Empire Loyalists came. Thus both Kingston and Niagara, two old French posts, had been resting points for years. Their names figure largely in the French wars; and as known and identified localities, they attracted many who clung to the British flag even in its reverses. Accordingly much of the early immigration came in by Newark—the present town of Niagara—and the surrounding district was settled early in the history of Western Canada. No one who had heard of the Duke of Bridgewater's Canal, and of Brindley; of Smeaton's Forth and Clyde, or Telford's Caledonian, could have failed to see the necessity of connecting the two lakes by artificial navigation. The Erie Canal was during this period, either proposed or in course of construction, and its example must have stimulated the appreciation of the geographical advantages apparent in the Niagara peninsula. The war of 1812, however, gave the great spur to thought. It has been seen also in the case of the Lachine Canal, that Sir George Prevost pointed out its necessity; and the news of that recommendation would be suggestive in the western world, of what was needed there. In the account of the Cornwall Canal, mention has been made of Gourlay and his views of the improvement of the Saint Lawrence. The description of them shews how imperfectly he understood the subject, and how visionary were his ideas. Such however as he was, so far as the enquirer can judge by existing records, he may be mentioned as the first who gave any defined views in writing on the subject; this was in 1819. And in his "Statistical Account of Canada," published in London in 1822, he furnished a map of the District, and pointed out the necessity of a Canal.

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* The history of the Welland Canal, until the close of 1835, is contained in a report of the Select Committee of the Upper Canada House of Assembly, appointed to enquire into its management. It is a volume of 575 pages, and contains some very extraordinary revelations. It does not fall within the scope prescribed to the writer to allude except in general terms to this document. Its contents cannot be entirely ignored even here, and it will be a special duty of the historian of the last fifty years to reproduce this Chapter in Canadian history. It may be briefly stated that of a Committee of nine, seven signed the report, in which it is stated that the books and accounts of the Company had been "kept in a very careless, irregular and improper manner, highly discreditable to a public body." That even on a partial investigation there was a defalcation of upwards of £1724; that the clerks were only able afterwards to account for £266 of this sum; that an item of £579 paid to a director was falsely entered in the accounts; that unjustifiable expenditure was entered into; "that the sum of £447 10s.," for loss on Steamboat Peacock, "is enveloped in mystery;" that there were irregularities anything but creditable to the Company's officers; that the various sums of £2500, £1000, £178 13s. 5d., £164 14s., and £100, "were without any authority of the Board given on loan to officers and directors;" that a Secretary was apppointed quite incompetent for the discharge of his duties; that improvident contracts were entered into, some of them most shamefully performed to the serious injury of the Company; that modes of raising money without the approbation of the Directors "was to say the least of it, highly injudicious, and might have involved the Company in serious difficulties; that the officers of the Company received water privileges, a proceeding stigmatized as highly improper; that in 1831 the Company sold to "an alien," through a third party all the lands of the Company, amounting to nearly 15,600 acres for £26,000; that 18 months interest was paid and refunded in the shape of water damages; that in 1834 the Company resumed the land excepting 200 acres in Port Colborne and Allanburgh, cancelling the debt of £25,000, and giving bonds with interest for £17,000 more. "This transaction, to your Committee," was "inexplicable; no statement that they have heard has satisfied them of the justice or even expediency of an arrangement which, if applied to the ordinary transactions of life, would not only be deemed ruinous, but the result of insanity." Further, that large sums of money were missing; that a shorter route for the Canal might have been selected at less expense to the proprietors; that the monies were expended improvidently; that a debt of £30,000 was forgiven without an equivalent; that £1340 worth of timber was bought, and which was "allowed to be stolen and lost to the Company without one shillings worth ever being accounted for;" that some was sold without the Company receiving benefit from the sale, and that some was used by contractors without the material being charged to them.

When it is added that everybody was exonerated from blame, and that not the least stigma was ever attached to any of the public men who were included in the above proceedings, further comment is useless.

He had, however, very crude ideas of what the work should be, and although his opinions are enunciated with much positiveness, his knowledge of the subject was evidently superficial to a degree. The friends of the late Mr. Merritt assert that he communicated the idea to Gourlay. It is a fair inference, that Gourlay can claim no particular originality of design; and if the thought in the first instance came from Mr. Merritt, it was a mere echo of a generally expressed opinion. But whoever the originators were, very little merit is due to them; for a wilder, more ill considered scheme than the one originally put forth, one shewing more ignorance and recklessness on the part of the projectors, it is scarcely possible to conceive.

The public accounts show the cost of the work to be about six and a half millions of dollars. The original estimate was £26,000, or $104,000.

The first idea of the route was to run up the natural waters of the Welland River or Chippewa Creek, and to pass across the township of Thorold, tunnelling through the high ridge of land about a mile and a half wide. and then proceeding direct by Canal to the brow of the high land. The latter was to be descended and overcome by a Railway connecting, by means of another Canal, with the navigable waters of Twelve Mile Creek, by which egress to Lake Ontario should be effected. The navigation was simply to be for *batteaux* and barges.

This project was put prominently before the world in 1823; an engineer of the name of Mr. Hiram Tibbett furnishing the description of the route. Public meetings were called, circulars were sent, and an address to the people of Upper and Lower Canada authoritatively disseminated, in which the probable expense of the undertaking was named at £22,125. Early in 1824, a petition was sent to the Legislature asking for an Act of Incorporation for a a Canal, to admit boats of from 20 to 40 tons, and at the same time defining the route. The capital was named at $150,000, being 3,000 shares of $50 each. The work was commenced on 30th November, 1824, "and as a proof "how little the subject had attracted public enterprise at "the time," says an official document, "not half a dozen "gentlemen of capital or influence in the district attended "this ceremony." The actual amount of stock subscribed at this time cannot be authoritatively given, but as the sum total of the subscriptions in Upper Canada amounted in 1836 only to £3,712 10s., the money in the Treasury must have been a small sum. It is true subscriptions had been taken up in Lower Canada and in the United States, but the Quebec subscribers, even in the previous year, had shown a marked want of confidence in the scheme. In the Annual Report, the Directors gave no figures; they merely stated that "a sufficient quantity of stock had been subscribed." Early in 1825 the Company came before the Provincial Parliament and obtained an amendment to their charter to raise the stock to $800,000; and the Canal was extended for sloop navigation. We learn from a statement of Mr. Merritt that on the passing of this Act the Hon. J. H. Dunn, "the President proceeded to New York and obtained "£75,000 subscriptions." The Committee reported in 1836, that the maximum of United States subscriptions was £69,625; a proof that the work had been commenced the preceding year with literally an empty exchequer. The ground was re-surveyed. The Welland River route was considered objectionable; or at the best to be developed to hasten the connection of the two waters; for although it was still to be retained, the advantages of a direct opening to Lake Erie through the Grand River was specially commended. The distance was estimated at 41 miles. Nevertheless it was still urged that a connection with the Welland River was virtually a connection with Lake Erie; that its junction with the Niagara River was only 18 miles from the lake;

and that although the current was strong, vessels could sail up against it. But at the same time it was represented that there would be difficulty in passing Fort Erie, owing to the great rapidity of the stream below that spot. It was accordingly considered advisable, that in order to avoid "this impediment to navigation," and to attain "other important advantages," a connection should be effected with the Grand River, which turned at a high level into a navigable feeder, would furnish both a sufficient supply of water and extend a satisfactory and quiet navigation. Considering that the work had been commenced, the discovery came late. But a change from the entrance by the Welland River, was in any circumstance wise and expedient. The size of the locks was established. The dimensions were 100 feet × 22 feet, with 7.6 feet depth of water: they were maintained in the construction of the first Canal, except that the sills had only 7 feet. The locks were 40 in number.

The route thus determined, the contracts were partially given out in November, 1826, at least it was so stated before the Committee of the House of Assembly, and the work from the Welland to Lake Ontario was to be so far completed by April, 1827, that the communication to Lake Erie would be assured by that date. The connection by the Grand River was hereafter to be developed. In this position, an application was made to the Legislature for assistance. Sir Peregine Maitland was then the Lieutenant-Governor, and he appears rightly to have estimated the importance of the project. The ground of this assistance is succinctly stated, viz.: that £25,000 had been subscribed in the Canadas;—the actual amount was not £14,000—that £75,000 had been subscribed in New York; and that the directors "being desirous that at least a majority of the "stockholders should be British subjects," a limit had been placed on American stock to that extent, and that accordingly £100,000 had been left for the English market; that the "Canal was rapidly advancing," and to prevent any delay in meeting the obligations consequent upon these works a loan of $100,000 was asked; a loan, the first of a very long series. The money was granted 9th January, 1826; 21 voting for the bill and 12 against it. Nor was this the only aid the Company received, for in a communication dated 30th September, of the same year, Lord Bathurst informed the Lieutenant-Governor, that the British Government would contribute the same assistance which had been given to the Lachine Canal, viz.: one-ninth of the estimated cost towards the completion of the Welland. As the cost was named at £147,240, the quota offered by the British Government was £16,350; the equivalent being free toll on Government stores for ever. With this material aid, the work went on in comparative tranquility, diversified by the failure of contractors, and the consequent arbitrations. But it was found that the stock did not sell in the London market; so an appeal was made again to the Legislatnre in January, 1827. This time a loan was not asked, but the Legislature was prayed to take £50,000 worth of stock. The Special Committee recommended that the stock should be taken, as the completion of the entire Canal would be placed without a doubt; and that the countenance of the Government would give a value to the shares, so that they would be generally sought after. Further, it was suggested that the stock was, in all respects, as good security as any which could be obtained for a loan; and it was obscurely hinted that the Imperial Government "from public inducements might take possession of the whole work," "an "arrangement which would be facilitated by the Government "becoming stockholders." The Act affording aid was passed the 5th February, 1827. The Bill however had a very narrow escape, 20 voting for and 18 against it. It is thus very evident that the scheme had fallen into great disfavor, so much so that Sir Peregine Maitland in his speech in proroguing Parliament made special allusion to it. He said he felt the responsibility of giving this additional aid, and that he cheerfully shared that responsibility. The result of this encouragement was, that the Legislature of Lower Canada likewise subscribed the sum of £25,000, taking stock to that amount.

The year 1828 found the Company still embarrassed. The enquiry of after years drew out the fact, that there was still £38,837 10s. of stock not taken; and it shews how recklessly this work was begun, and the extent to which foresight and calculation were wanting. It was now considered that the sum of £90,000 was required to finish it. The amount in the exchequer was a little more than £21,000, and this was only prospective, being 19 per cent on 8,893 shares. As it seemed that little could be obtained from the Canadian Legislature, an appeal was made to the Imperial Government who, with a truly Imperial generosity, advanced to the undertaking £50,000 sterling; security being given on the tolls, funds and all property of the Company. In the year 1829, no loan was applied for. The works were, nevertheless, pushed on with great energy so that two vessels, in the month of November, passed between Lakes Ontario and Erie. In the following year this fact was made a ground for a new appeal to the Legislature. It was certainly something to say that vessels drawing 7½ feet of water with 21½ feet breadth of beam, could sail from Lake Ontario, a distance of 16½ miles of canal, ascending 34 locks, and pass down the River Welland to the Niagara. It may be worth while to preserve the names of the schooners: they were the "Ann and Jane," and "R. H. Boughton." The route of that day may be thus briefly described. About a quarer of a mile west of the entrance to the Welland River, a canal commenced, leading to that stream, through which the route ran, 9½ miles, ascending by two locks to the deep cut, at which point the Canal proper commenced, the feeder of which was the Grand River, carried by an aqueduct across the Welland; from this point it descended to Lake Ontario. The sum of $100,000 was named in this year as necessary to complete the work, and the petition prayed that the stock should be increased to £300,000. Reference to the records of Parliament of that day, shows how unwelcome the application was. It was, nevertheless, favorably entertained, 19 voting for, and 9 against it. It was during the debates on this grant—which were evidently stormy enough throughout—that, on a motion that the Welland Canal Loan Bill be read a second time that day three months, the votes were equal—24 against 24; the Speaker, the present Mr. Justice McLean, giving a casting vote in the negative. Throughout the session the measure was violently opposed, and escaped only by majorities of two and three. Besides granting the money, the Act likewise authorized the appointment of a Commissioner to examine the canal, and to report to the Lieutenant-Governor all facts and information that might be useful to aid in forming an opinion of the progress of the work. Mr. Randall, who was appointed to this duty, reported 31st May, 1830. He bore general testimony in favor of the stability of the works. Specially he examined the "Deep Cut," which gave much trouble during construction. His remarks throw little light on the subject, but he regrets that more preliminary precaution had not been taken. At the close of the year, the work was so far completed as to afford a convenient communication by the Welland River. But the Directors were not satisfied; the route was described as "tardy and circuitous;" and it was determined to apply to the Legislatures of both Provinces, and to ask equally of each $100,000, so that a Canal would be taken directly to Lake Erie. On the 14th of March, 1831, an Act to afford further aid to the Welland Canal was passed, authorizing the

Receiver-General to issue $200,000 of debentures, as a further loan. It was much opposed; 25 voting for and 21 against it. In 1832, no call was made upon the Legislature; but, in 1833, an Act for affording further aid towards the completion of the Welland Canal was passed, appropriating $30,000 to subscribe for the unsold stock, and at the same time the expenditure of this sum was placed in the hands of Commissioners. In 1834, fresh legislation was called for. It was stated that the means of the Company were exhausted; that the concern was in debt $100,000, and another $100,000 was needed "to put the Canal in a complete state for use the next season." Such was the unpopularity of the scheme, that the Committee of the House to whom the petition was referred, shrank from the responsibility of making any recommendation. They hoped that something might be done to place the Canal in such a situation as might be most beneficial to the public interest. The members who supported the petition acted with their usual energy, and it resulted that an additional aid of $200,000 was given, stock being taken to that amount. The money was raised by debentures, paying 6 per cent. The votes on the motion were 22 against 14. The stock was likewise, by enactment, increased to a million of dollars. It was further provided that the affairs of the Company should be managed by four directors, three of whom should be named by the House of Assembly. It is true, that by these means an apparent control was placed in the hands of the Legislature; but, by accepting the responsibility, the House became, as it were, identified with the future management. The year 1835 was marked by no particular vicissitude. Sir John Colborne was then Lieutenant-Governor, and he communicated to the House an Imperial despatch from Mr. Spring Rice, the Colonial Minister, that he could not recommend the Imperial Government to cancel the debt of the Canal Company of £50,000, for a loan only made five years before. The Assembly had, with some inconsistency, asked this act of favor at the hands of the Imperial Government; on what ground it is somewhat difficult to say. During the session, Messrs. Thorburn, Duncombe, and Mackenzie were appointed directors. There cannot be a doubt that these gentlemen went to their duties with a knowledge of the general dissatisfaction which existed generally in the Province. The continued calls on the public chest, the unsatisfactory and contradictory statements, the Canal ever on the verge of completion and never finished, had destroyed all confidence in the management of the undertaking. There seems to have been a foregone conclusion that the Canal was a necessity, and that if the Province did not complete it, it would remain unfinished; and it followed that the Province must take possession ot it. Feelings of this character led to a very unfriendly supervision of the accounts and antecedents of the Company, and ended in Mr. Mackenzie making thirty specific charges against the directors. The decision of a Committee of the Legislature, appointed to consider them, has already been given.

The following " concise statement of the property in the Canal, as it is held by individuals and the public," was appended to the report:

Loan by Great Britain (Prov. cur.)....	£55,555	11	2
Loan by Upper Canada	100,000	0	0
Stock taken by Provin. Legislature ...	107,500	0	0
Stock taken by Lower Canada	25,000	0	0
Stock in England by private individ'ls	30,137	10	0
Stock in United States by do.	69,625	0	0
Stock in Lower Canada by do.	13,825	0	0
Stock in Upper Canada by do.	3,712	10	0
Stock in New Brunswick by do.	500	0	0
	£405,855	11	2
Advanced this year by Parliament....	2,000	0	0
Total........	£407,855	11	2

The report concluded by stating that £425,213 3s. 5d. had been expended, "less £100, which appears to be balance in hand 30th December, 1835." No money was, however, obtained that session. But in November, 1836, the Directors came again before the House; Sir F. B. Head was then Lieutenant Governor. On the petition of the Company, a Select Committee recommended that the Canal should be made strictly a public work; and that the Receiver General should issue debentures to the stockholders for their stock. An amendment was moved to the report, limiting the expenditure to the money sufficient to keep the Canal in repair; but, although proposed by the Solicitor General, it was voted down by 31 against 27. On the 17th December, a second report was presented. It sets forth that the sum of £814,319 6s. 2¾d. (*sic*) was the amount required to be paid by the Province to make the Canal "strictly a public work:" including the Provincial expenditure for stock taken, and for the several loans advanced to the Company. Of this sum £200,000 was estimated as necessary to complete the Canal permanently. The Report did not recommend that the whole money should at once be paid: £100,000 would be ample for 1837, which would include £55,000 to replace the wooden locks by stone structures. The matter, in this position, came before the House on the 11th January, 1837. The first resolution was carried by a vote of 29 against 6. It affirmed the paramount importance of the Canal, the necessity of its completion in a substantial manner, and that stone locks should be substituted. The remaining resolutions appropriating the following sums were voted through with little opposition:—

£20,000	to purchase the Hydraulic Works sold.
£25,000	to enable the Company to pay its liabilities.
£200,000	to complete the Canal in a substantial manner.
£117,800	to purchase the Stock of private individuals.

The Act embodying these resolutions was carried by large majorities. Indeed it was now apparent to all, that without the direct intervention of the Province, the Canal would experience fresh difficulty. Still the Legislature did not advance the full step of assuming the work. The £102,000, previously advanced on loan, was turned into stock, and the Government was authorized to subscribe £245,000 new Stock ($980,000.) The Capital Stock of the Company was declared to be £597,300. The Directors were further limited to an expenditure of $400,000 on the Canal, in full of repairs, new works, and old debts, during the year. The troubles of 1837 and 1838 prevented any further legislation, and no further steps were taken with regard to the shareholders until April, 1839, when a resolution was carried by a vote of 26 against 9, that the private stock should be purchased by the Province, in order that the Canal should become wholly the property and be under the management of the public. As above stated, the amount was £117,800, of which, in 1836, £31,712 10s. was owned in Canada. Of all legislation on this subject, this record is the most pleasing to read, for it was just and honest; and as the Stock was not held in the Province, it was untinctured by selfishness, while at the same time it was necessary and politic. The Bill was reserved for Her Majesty's pleasure. When the Legislature met, later in the year, even the pressing business attendant on carrying the Union Bill did not deter "the friends of the measure" from moving an address, asking Her Majesty to give her assent. It was carried on the 25th of January, 1840 by 23 against 11. The Bill, however, did not become law until the 5th July, 1841, the first session of the United Parliament, when Lord Sydenham sent a message to the House announcing that Her Majesty had confirmed the Bill in Council on the 11th of September previous.

We have now arrived at that period in the history of the

Province when the improvements were carried on systematically and simultaneously. In opening the first United Parliament, 15th of June, 1841, Lord Sydenham dwelt on the improvements in the navigation, promising the Imperial guarantee to the loan required to effect them. "The generous " aid," continued his lordship, " which I have already an" nounced to you; the determination which I am also em" powered to state on the part of the Government, to devote " annually a large sum for the military defences of the " Province; the fixed and settled determination which I " have the Queen's command to declare, that her North " American possessions shall be maintained at all hazards, " as part of her empire, are pledges of the sincerity with " which the mother country desires to promote the pros" perity of Canada, and to assist in the well-working of the " new institutions which it has established." In conformity with this pledge, on the 20th of August a message was sent down to the House, enumerating, in one general plan, the different works demanded by the public voice. The total cost was £1,470,000 currency, to be expended in a period of five years. The sum named for the Welland Canal was £450,000. The resolutions confirming the expenditure were carried on the 7th of September, one member only voting against them.

Some effort was made to increase the size of the Welland to that of the St. Lawrence Canals. Lord Sydenham, however, shrunk from the expense. He considered that, with the present size of the locks, the Welland could sufficiently compete with the Erie Canal route. Nor was the military view of the question neglected, for a proposal was made to construct locks 56 ft. wide by 280ft.,* with 10 ft. depth of water.

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* The dimensions given in Mr. Killaly's memorandum 20th August, 1841, (appendix C. C. Journals House of Assembly, 1841,) are 180 feet and 56 feet; a disproportion so great as to be suggestive of error. On application to Mr. Killaly, I learn that the length should be 280 feet. The figures are correctly given in the text. I take this opportunity of thanking Mr. Killaly for the courtesy with which he has answered the many enquiries I have addressed to him relative to the public works of the Province. From his long connection with the Board of Works, he is necessarily in possession of much information, which on all occasions he has readily communicated to me.

Although this proposition was rejected, it was wisely determined to construct larger locks at both ends, so that in case of danger, steamers could enter and run some miles inland. The adoption of this plan led to the ultimate enlargement of the succeeding locks to Saint Catherines, bringing that town within the navigation proper of the Saint Lawrence. The work was immediately commenced, and the enlarged line, by the way of the Grand River feeder to Port Maitland, was opened in 1845. Consequent upon the progress of the work, the main canal from the junction westward to Lake Erie was laid dry, to give the bottom a width of 26 feet, and to make Lake Erie the feeder. But the failure of several "sets of contractors, and the prevalence of sickness amongst the laborers, retarded the operations so much," says an official account, that this portion of the route was not opened until 1850. It was even then unfinished, and accordingly arrangements were entered into to complete the work by means of dredges. This operation was carried on until 1854, when the contractor abandoned it. In the meantime it was found that the width of 26 feet was totally insufficient for the trade, and it was determined accordingly to increase it to 50 feet. On the other hand, it has been seen that the Grand River supply year by year becomes less, and that the steadiness of that source can not be relied upon; that to keep the Canal so supplied, was to run the risk of failure in the navigation; a contingency not even to be thought of without alarm, and against which there could only be one remedy, viz., to turn to Lake Erie as the supply. The consequence has been, that the work is nearly brought to a close, and that the Canal throughout has been widened to 50 feet at the bottom, to a level admitting the Lake waters.

The total expenditure up to the 31st of December, 1863, is described in the Public Works Report for that year.

Expended prior to 31st December, 1841....	$1,851,427 77
Debentures issued under 7 Vic. c. 34, for payment of back interest on Stock	675,356 42
Amount expended under Department of Public Works, for enlargement, erection of permanent structures, and land damages	4,766,460 70
	$7,293,244 89

This sum however cannot be considered to represent the cost of the work. It is merely the aggregate of all the vouchers which have been charged to the account of the Canal. Below is appended a statement extracted from the Public Works Reports, of the sums paid for repairs and management for sixteen years. In some instances they are kept distinct, in others the total of the two are shewn. We learn from them, however, that for the last six years, the "management, &c.," averaged about $40,000 per year, whereas in 1850 the cost was $13,500. In the Report of 1849 it was estimated that the future expense of management would be £2,804 ($11,216), and of repairs £2,600 ($10,400).

Year.	Maintenance, Repairs and Renewals.	Management.	Total Maintenance and Management.
*	$ c.	$ c.	$ c.
1847	Not given.	Not given.	48,623 00
1848	do	do	Not given.
1849	11,244 91	8,248 82	19,493 73
1850	12,425 21	13,510 19	25,935 40
1851	Not given.	Not given.	49,589 00
1852	do	do	56,802 67
1853	do	do	87,700 09
1854	do	do	99,410 06
1855	do	do	122,379 95
1856	do	do	99,483 65
1857	do	do	108,629 24
1858	61,806 84	42,642 97	104,449 81
1859	37,584 27	40,988 89	78,573 16
1860	Not given.	Not given.	66,312 60
1861	16,932 11	39,807 88	56,739 99
1862	22,120 73	39,129 49	61,250 22
1863	15,392 02	40,855 95	56,248 00
			$1,141,620 57

The inequality of these amounts does not admit of generalization. Where there are no details to guide, one would conceive it is not possible that maintenance alone would in one year exceed $80,000, and in another be a trifle above $15,000. The inference is, therefore, quite legitimate, that there has been no well-considered separation of what should be placed to permanent works and what to repairs, and it is hardly possible to apportion the amount fairly chargeable to capital. One has, therefore, to take an arbitrary mode of arriving at results. We have, however, the

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* The first mention of the cost of Canal repairs and management appears in the Reports presented to Parliament for the year 1848, from which the amounts for 1847 are taken. My own impression is, that the date is a typographical error and intended for 1848. I do not, however, feel justified in making the alteration. No mention is made in the Report of 1847 of the disbursements for the year.

authority of the Report of 1863, for stating that about $1,400,000 is chargeable to increasing the depth of water to ten feet on the mitre sills of the locks, and to widening and bottoming the summit level to admit the waters of Lake Erie as a feeder. As this amount has been expended since the Union, and $2,526,784.19 was paid before the Union, we know positively that $3,926,784.19 has been expended totally independent of the main work for the enlargement of the Canal and locks. The Canal may be looked upon as having been opened at the present capacity in 1846, and may be considered to have been in operation 18 years. Unfortunately, in the figures compiled, the greatest expenditures are precisely those, where no distribution has been made. The magnitude of the amounts itself suggests the idea, at the same time, that much has been included as repairs which really was a part of the cost of the construction. It becomes, to some extent, a matter of opinion what these statements really represent. If, however for these 18 years $500,000 be allowed for management and $300,000 for repairs and renewals, which would be nearly at the rate of $18,000 a year, the approximation arrived at, may claim to be at least theoretically just. The vouchers are still in existence, and those interested in the result can easily disinter them to prove what the repairs really were Making this reduction of $800,000 from $7,293,244 89, will place the cost at $6,493,244.89, or, in round figures, six and a half millions of dollars.

The history of this Canal has been very fully given, for unmistakeably it affords its moral; and if there be teaching which in the conduct of public works should lead to the avoidance of error, it is here. We find a small clique of irresponsible men, with no special aptitude, taking possession and to no little extent enjoying all the fruits, of the management of a project, which was national in its character. Their earliest and great idea was definitely to establish the line, and we fear we must conclude that this choice was purely a matter of self-interest. There were no difficulties to bewilder the judgment. Once establish the necessity of connecting the two great Lakes, which every one recognized, and there was never a plainer or easier question to decide. It was to have made Lake Erie the feeder, to have selected the easiest descent from the upper to the lower level, and to have continued the most direct and best connections with the two Lakes. The Grand River feeder was in no way necessary: that it should have been at all constructed seems only explained by the apparent economy of its choice, which would weigh with inexperienced men. The least disinterested examination of the ground, and an ordinary calculation of consequences would have given an answer to the problem. The expense of the dam and the 21 miles of feeder, and additional cost of locks and the unnecessary lockage, ought to have suggested, even to a tyro, that the expenditure would have been greater than deepening by 7 feet, 14 miles of Canal already constructed. For some years past, the fashion has been to speak in complimentary terms, of the energy of those who were more immediately connected with this work. The writer, who traces its history dispassionately, must hold the directly opposite opinion. It is a mere assertion that it could not otherwise have been completed. On the contrary, it was a national necessity, and must have commanded attention from the Legislature. The very supposition is grossly unjust to the public men of that day, who, as a rule, warmly supported the work, and sustained it in all the crises through which it passed. The assistance given by Parliament sprung from no other cause than sympathy with the undertaking; and had the country not been taken by surprise, so that the control passed out of the hands of the Legislature into that of a Company,—which in a pecuniary and responsible sense was never anything but nominal,—this Canal must have been constructed by the Government, as the Cornwall Canal was a few years later. As it was, the work was virtually carried on by the Upper Canada Government so far as supplies went, for the total subscriptions to Stock were below £118,000. There cannot be a doubt that had this project been taken up by the Executive, as it ought to have been, both the Imperial Government and that of Lower Canada would have contributed. But this opportunity was forestalled by the few, who laid their grip upon the work only to delay it by incompetency and mismanagement. The consequence is that this work is incomplete at this day. Taking, for the sake of argument, even the present size of the locks as a finality, the Canal must be held as unfinished until Lake Erie is actually the feeder without risk of loss of supply, and there is at least 100 ft. width at bottom; whereas at this moment the width is but 50 feet. That slides and difficulties should have occurred at the "Deep Cut"* was caused by want of knowledge. Any engineer knows, that by the help of good drainage and with banks of sufficient slope protected by sods, any cut may be secured; and so much heavy excavation would have occurred here, that it could have been done at a very low rate. The consequence has been, that the work has had to be performed year by year by dredging machines, at great cost, and very slowly, and is even now scarcely completed forty years after its commencement. It may be asserted that this expense has been necessitated by no new view of the subject; a prudent and reflective mind would have seen its necessity, in the inception of the undertaking. The loss to the country by the recklessness of these men is immense. The Welland Canal has cost as much as the whole of the Saint Lawrence Canals; and it is no exaggeration to estimate that $2,000,000 of money have been wasted in its construction. For the latter are 41 miles in length against the 28 miles of the Welland. The locks are 200 × 45 feet against 150 × 26.6 feet, and the canal proper is just double the capacity.

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* The opinion to some extent prevails, that the water in the deep cut, could not be reduced to the Lake Erie level, without damage to the Canal banks at this spot. I do not entertain this opinion. I visited Allanburgh in March during the thaw, with Mr. George Stoker, assistant engineer of the work, who with much kindness accompanied me there, and I found the eastern bank which has been protected by sods, perfectly firm. Should it however fail, the remedy would be found, in increasing the slopes, still applying the sodding, or if necessary by interweaving faggots from the base. I certainly do not see why the additional eight feet of elevation given to the bank, should lessen any security which exists at present, if proper precaution be taken. There would still be 10 feet of water to act as a pressure against the sides, if it be needed. The decomposition of the material, however generally takes place at the surface, and it is in this view that the covering of the sod is effective. The work on the eastern bank is well and creditably performed; and whatever be the dimensions of the canal, it is indispensable, that its banks be protected in this manner, from wash, in order to avoid all risk of filling up the channel. The expense of the work, in this point of view will pay itself a hundred fold, by obviating the necessity of dredging.

The present position of this Canal is, that it is utterly insufficient for the trade which passes through it. That it must be widened and deepened, and that the locks must be enlarged, is admitted if it is to become equal to the requirements upon it. Even should the policy of deepening the whole series of Canals be rejected, the Welland must be improved. The question is, to what extent should the enlargement be made? It is urged that much of the craft of Lake Erie cannot now pass the Canal to Lake Ontario; but the argument in this form has not great force. There is a navigation peculiar to Lake Erie which is not met with on Lake Ontario; and the limit to be applied to the Welland Canal must be sought in the navigation of the Saint Lawrence and not in the Upper Lakes—and here we have no identity of view.

Mr. Jarvis, in his Report on the Caughnawaga Canal, places the dimensions of the locks at......................	230 × 36 × 10ft.
10ft. depth of water on sills.	
Mr. Walter Shanly, in his Ottawa Report, takes the "Iowa" as a representative propeller, and proposes.............	250 × 50 × 10ft

Mr. T. C. Clarke, in his Report upon this Survey, names	250 × 45 × 12ft.
Mr. Kivas Tully, in his Georgian Bay Report, advocates the recognition of 1000-ton propellers, and accordingly specifies........................	265 × 55 × 12ft.

Be the dimensions what they may, the necessity must be recognised, that two vessels navigating the Canal, may pass at any part of it: hence, the width at the bottom must be at least 100 feet. The extent of the improvement will be argued, under the general head of the development of the Saint Lawrence navigation, necessary to command the trade of the Western Lakes. For the moment, all that need be said is, that the enlargement of the Welland is a mere question of extent and finance.

BURLINGTON BAY CANAL.

This so-called Canal is an open cut, secured with crib-work across the sand bar at the entrance to Burlington Bay, by means of which access is had to Hamilton by first-class steamers. It is 13 feet deep and about 120 feet wide. The channel in Burlington Bay approaching the Wharves at Hamilton is from 12 to 25 fathoms in depth, but in front of most of the Wharves the water is not more than 11 feet deep.

The Public Accounts of 1852 give the cost of construction as follows:

Expended before the Union............	$124,356.06
Expended since the Union	203,826.85
	$328,182.91

These works, in reality, form the entrance to Hamilton Harbor. Unlike most of the works of the Province, they pay a fair per centage on the investment. Allusion will not again be made to them, for they do not come within the scope of the argument; the consideration of keeping the entrance channel to the capacity of the Saint Lawrence navigation being the only question involved.

The following is a Statement of the Revenue for the last nine years :—

Year.	Gross Revenue.	Repairs and Management.	Net Revenue.
	$ c.	$ c.	$ c.
1855	22,839 06	7,120 55	15,718 51
1856	24,750 94	10,120 35	14,630 59
1857	15,826 19	980 00	14,846 19
1858	13,790 89	800 00	12,990 89
1859	14,358 95	1,122 63	13,236 32
1860	3,504 76	800 00	2,704 76
1861	"	400 00	"
1862	"	500 00	"
1863	17,645 30	405 00	17,240 30

THE DESJARDINS CANAL.

The Desjardins Canal is 3.68 miles in length, and prolongs the navigation from Burlington Bay to the pleasantly situated Town of Dundas. It was originally commenced by Mr. DesJardins, whose name it bears, and who obtained an Act of Incorporation in January, 1826, to construct a canal for sloops through the marsh at the back of Burlington Heights, known as "Coote's Paradise." The depth of water proposed was eight feet, and the capital named at £10,000. The money was subscribed in the neighbourhood. The canal was opened on the 16th of August, 1837. It is 33 feet in width, and available for vessels drawing 9 feet of water, having cost $98,684. During its construction, $68,000 was advanced by the Government, bearing six per cent. interest.

The canal has not been profitable as an investment, and neither the interest nor principal of the loan has been paid. In 1840, the directors, in a memorial to the Lieut.-Governor of Upper Canada, proposed to surrender the property to the Government; the offer was repeated after the Union to Lord Sydenham, but without success.

The present entrance to the canal was excavated by the Great Western Railway Company in 1853; a fruitless attempt having been made to obtain a foundation for a bridge in the natural ravine through which in former days Dundas was reached. No alternative presented itself, but to throw an embankment across the opening, an operation by which the canal was closed; consequently it was incumbent upon the railway to effect a new approach. The canal is still used for the transmission of lumber and freight. Its receipts are sufficient to keep it in repair. Since the construction of railways, steamboat communication with Dundas, except as an occasional excursion, has ceased.

THE GRAND RIVER.

To overcome the falls, and to make the Grand River navigable to the Town of Brantford, a series of improvements were constructed by a company, in which the Six Nation Indians invested the sum of £38,000, and to which the Municipality of Brantford advanced a considerable sum on loan. Locks were constructed at eight different points, the first of which in ascending the river is at Indiana, where there is a fall of 8 ft.; the second is at York, where there is a fall of 5 ft. 9 in. "Sims'" Lock, or number three, is one mile and a half farther up, where there is 8 ft. 6 in. fall. Locks are constructed, at Seneca, with 5 ft. 9 in. fall; at Caledonia, with 7 ft. 6 in. fall; whence there is a slack water navigation for 25 miles, to within 2¾ miles of

Brantford, where there are three locks, having a lift of 11 ft., being 146 ft. 6 in. long, and 32 ft. wide. Vessels accordingly can reach Brantford. The lower locks are 116 × 32 ft.

Before railways were in operation, a large amount of freight was carried through this canal to Buffalo and Saint Catharines by the Welland Canal. The trade is now almost exclusively restricted to the transportation of heavy and bulky articles such as coal, lumber, salt and gypsum, in scows of limited capacity, on account of the low water in the canal navigation of the river. The lower waters of the Grand River connect with the Welland Canal by the Dunville feeder.

The Municipality of Brantford has foreclosed its loan, and holds possession of the entire works. The management is now in the hands of a Receiver, appointed by the Court of Chancery. The receipts from lease of water-power amounts annually to a considerable sum, and with judicious management, might be largely increased.

These works have no connection with the subject of these pages; but mention of them is necessary for the purposes of description, and to shew by their character and extent, the light in which they must be regarded in any extended scheme of Provincial improvement.

CHAPTER III.

PROJECTED WORKS.

From the constructed Canals we turn to those projects which are advocated as essential improvements, and which have been brought pointedly before the public.

OTTAWA AND FRENCH RIVER NAVIGATION.

The first in magnitude is the Ottawa Canal, which was made known in 1858, by the full and carefully written report of Mr. Walter Shanly. It is proposed to pass from Lake Huron up the French River to Lake Nippissingue; to construct a Canal across the water-shed of the Saint Lawrence and Ottawa into Trout Lake, at the head of the Matawan (a tributary of the Ottawa), and to follow that stream to the junction of the two rivers; then to turn into the Ottawa, and to follow its course to tho Island of Montreal. The supply was proposed to be taken from Lake Nippissingue, raised by dams to the height of Trout Lake, 23 feet higher than its natural level, "at once in-" creasing the storage capacity ot the summit from twelve " to upwards of three hundred square miles." The rapids on the route Mr. Shanly proposed to throw back by dams, in the mode pursued on the Rideau Canal, introducing locks where necessary to overcome the difference of level of these artificial reaches. The French River, like the tributaries of the Ottawa and that river itself, is not navigable, owing to the various rapids which intervene. These various impediments would be removed by eight dams and one mile of canal navigation. The number of locks would be eight, overcoming 67 feet. Lake Nippissingue, it is estimated, would need three dams. To pass the summit would require a canal of five miles, with a maximum cut of 30 feet through granite rock, overcoming 16 feet of a lift by two locks, the summit level being 83 feet above Lake Huron, in a distance of 85 miles.

Descending the Matawan, the distance, 40.42 miles in length, would consist of 30.66 miles by river and 9.76 miles by canal. 170 feet of descent would be overcome by 18 locks, and 13 dams would be necessary to control and assure the navigation.

Descending the Ottawa to the City of Ottawa, we have a distance of 195 miles, of which only 22 miles are canal navigation. The descent is 376 feet to the basin from whence ascend the tier of locks to the Rideau Canal. Mr. Shanly's estimate of the work is $24,000,000. He does not "venture to calculate on more than 180 days' navigation," considering Sunday a *dies non.* Adding one-sixth to his figures, will give 210 days, which may be considered as from 15 to 20 days less than the navigation on the Saint Lawrence route.

From Ottawa to the Lachine Canal a long series of works and improvements will be required. The present Grenville and Carillon Canals being quite valueless for the upper limit of navigation, improvements will be necessary in both the Ottawa and Saint Lawrence.

The geographical situation of this navigation can only have in view the trade of Lake Michigan, for from the lakes east of these waters the nearest route is by the Saint Lawrence, hence the comparison is narrowed to the distance between Chicago and Montreal. It is as follows:

By the Welland and Saint Lawrence Canals, the distance is	1,348 miles
By the Ottawa route	980 "
Therefore by the Saint Lawrence there is an excess of	368 "

And upon this, it is estimated that the time taken on the former route would be 196 hours; on the latter, 152 hours. So, that with these two parallel lines of navigation, the gain to a vessel, by the most favorable calculation, would be 44 hours in proceeding from Chicago to Montreal by the Ottawa; and that for purposes of Canadian navigation the Canal is utterly unnecessary. Mr. Shanly estimates the reduction of the cost of transport per ton at 37 cents. He avoids all the Saint Lawrence Canals except the Lachine.

It may, however, be said, that in descending the Saint Lawrence, a vessel taking the upper and Longue Sault rapids would save some hours. Some even assert, that the lake and river trips would be made in about the same time as that estimated by the proposed Ottawa navigation; for the average speed of a vessel, taking the river may be considered at 9 miles an hour, which will give 150 hours for the 1,348 miles; adding 15 hours additional for passing through the Welland and 10 hours for the Beauharnois and Lachine Canals, we have a total of 175 hours; that is, supposing the Welland to be enlarged. But should any improvement to the Upper Rapids be unattainable, twelve additional hours must be added for the Williamsburg and Cornwall Canals, which will increase the time to 187 hours.

Against this time there is the estimated period of 152 hours by the Ottawa route. But it must be borne in mind that the former is a known practicable route, while the latter is still a theoretical deduction, without allowance for contingencies or impediments.

Mr. Shanly's report is simply an examination of the route, and an inquiry as to the possibility of forming an artificial system of navigation. He does not argue that the policy of developing it, is pre-eminent. He merely sets forth the scheme in a tangible recognizable shape. In this respect the duty of an engineer is frequently misunderstood, and the fact, that a man of ability and character has been deputed to survey and report upon a project, is accepted by many as a foregone conclusion, that he is hereafter to be its strenuous and unflinching advocate, under all circumstances. This idea creates wrong impressions, and leads to much mischievous error. An engineer is not a special pleader, with evidence placed in his hands, to be urged to the detriment of other and more legitimate undertakings. He is not called upon to make comparisons. He has to confine himself to the problem which professionally he has to examine. His duties are positive; and accordingly he does not consider the negative side, unless distinctly instructed to do so. His main inquiry is to determine whether the project be feasible; and if so, what it will cost. He has then to take into account what results will be attained, and how they may be attained. But it does not follow because he goes thus far, that he becomes an advocate for the necessity of the undertaking. What he should do, is simply to show the strong side of the proposed work, without any exaggeration: and when this information is put in such a form that it can be considered, the results can be approximated. It is just in the nice perception of the possible effects of a commercial line of policy, that the capacity of men appears. The statesman, considers with calmness, the price at which they may be purchased, what interests they subserve and what they destroy, and the extent to which they operate on the whole community. The politician has just the one thought; what he, or his clique, or his party may gain by them.

Mr. Shanly has gathered together the facts, and presents them in a reliable form. He shows us what can be effected and how much money it will cost. He does not, however, say that the future of the Province is merged in this one enterprise, and that it would be justifiable policy to leave Western Canada as it is, or rather to divert trade from it. He does not consider the present Saint Lawrence

Canals to be ample and sufficient, and does not ignore the necessity of deepening them. It is somewhat hard to see how the cost of transport by the Ottawa will be less than by the existing route. If tolls be affected at all by outlay, (as a rule they are a matter of expediency,) the tolls of the Ottawa route would be fully as high as those of the Saint Lawrence Canals, even when improved; for, it is considered that twelve millions would effect all the changes which the most unflinching advocate of the advantages of the lakes and river would exact. This sum, added to the thirteen millions, the cost of the Welland and Saint Lawrence Canals, would be the outlay for the Ottawa route, and accordingly it should exact about the same tolls. Why, then, should we undergo this expense merely to form a parallel route to the Saint Lawrence, with the same rate of tolls, possessing, as a theory, just 24 to 44 hours of advantage in time, that is to say, without making allowance for any contingency of delay? Really nothing more than this is promised. The argument that lumber would find an increased market cannot be seriously advanced, for rafts have descended to Quebec, and will still descend there, be the navigation natural or artificial. The plea that settlement would follow in the train of the work, specious enough in itself, is a very doubtful prophecy. For the whole line of navigation would simply be a highway, through which a passage would be effected as rapidly as possible. Indeed, its very excellence is advanced on the saving of time it would effect.

But, on the other hand, so large an expenditure would be urged as an argument against any improvement in the Saint Lawrence; or even if not so urged, would make it impossible. An increase of the debt of the Province of one-third must interfere to prevent any fresh works from being undertaken, even supposing that men were to be found to advance the money. To pay the interest and the cost of management and repairs of the French River and Ottawa route, would demand little short of an annual revenue of one million and three-quarters of dollars. Where would it come from? The Saint Lawrence Canals will probably give, in 1864, $300,000 gross revenue. The Ottawa Canal offers no one ground to hope for an increase of traffic from fresh channels of trade, because it does not contemplate more than the delivery of freights at Montreal. At this moment, the drawback in the Saint Lawrence route, which virtually destroys its importance, only appears at the foot of the Canals. It is well known that while the present relations in trade prevail, ocean freights from Montreal will continue high; and this difficulty, without a radical alteration in the whole character of the Western commerce, is insurmountable. The weak point in the Ottawa project is, that it neither considers the fact, nor in any way creates the remedy. Were it carried out, if the theory of its excellence be correct, it would injuriously affect many interests of Western Canada, without one compensating benefit, or one single national advantage.

In March, 1860, a report was made on the same subject by Mr. Thomas C. Clarke. He estimated the distance from the embouchure of the Lachine Canal to Lake Huron at 422.26 miles, and the cost of completing a navigation to the same extent as that named by Mr. Shanly at $12,057,680; exclusive of additions to the Lachine Canal, and the improvement of Lake Saint Louis. Mr. Clarke limited his canal navigation to 20.82 miles, thus making his river and lake navigation 401.44 miles. The number of locks he named at 64, and the lockage at 665.70 feet; and of the whole distance he considered that 351.81 miles were already a good natural navigation, and require no improvement.

The discrepancy between the estimates of the two plans is partially explained by the different modes of construction recommended. Mr. Clarke resorts to dams to a much greater extent than Mr. Shanly, who holds that it is preferable to cut out canals at the side of rapids, to raising by artificial structures, the levels of large rivers, such as the Ottawa. Mr. Clarke resorts to dams in all cases; Mr. Shanly, never without reluctance. There is also some difference in the estimate for taking out the hard gneissoid rock of this region; Mr. Clarke estimating it at $2, Mr. Shanly holding, after much experience in this kind of work, that it can not be taken out under $4 a yard. Mr. Clarke took no account of the Lachine Canal, which must be enlarged to the dimensions of the rest of the route; and he made no provision for any improvement of the entrance to the Georgian Bay, which can only be effected at considerable outlay. But making the due allowance suggested by this explanation, there is still a considerable difference of opinion as to the ultimate cost, which is not accounted for. Mr. Clarke, in round figures, considers the cost of the work at exactly half the amount of Mr. Shanly. The latter thinks that twenty-nine miles of canal navigation are necessary; the former, twenty-one. It is thought that Mr. Shanly, on re-examining the work, would rather add to, than diminish his mileage of canals: for his report is more the account of an exploration, than of a finally arranged plan, where everything was calculated and determined. Mr. Shanly has been a quarter of a century before the public, actively engaged in his profession, and has deservedly a high reputation; and those who know him have difficulty in believing that his calculations would be above the requirement. To pronounce an opinion of the accuracy on either side, without a careful survey and examination of the whole route is, however, impossible. All that can be stated here is, that the difference of the estimated cost exists to the above extent.

The Committee of the Montreal Board of Trade, have endeavored to modify the difference, and Mr. Shanly has been asked to consider if the cost can be lessened. The difficulty has been met by a proposal to reduce the main channel of navigation to 8 feet: and with the view of deepening it hereafter to 10 feet, the size of the lock originally designed is to be maintained (250 feet by 50 feet with 10 feet on the sills.) This alteration will bring down the outlay to $16,000,000: and if the locks themselves be reduced to 160 feet × 33 feet with 8 feet of water, the cost may be named at $14,000,000.

The intent of the project as set forth by the Montreal Board of Trade, is plainly to create a rival to the Saint Lawrence route, " to obtain the largest desirable carrying capacity for river and canal craft." Nevertheless, the claim is advanced that a project of so great magnitude, and aiming at such broad results should be undertaken as a provincial work: and a provincial guarantee of the interest of the cost, is suggested as the measure which would ensure its completion.

In Western Canada, with our canals neglected, we can only recognise in the project a continuance of the policy which we desire to reverse. The Ottawa route will not enlarge the commercial relations of the Province as a whole, and is injurious to the west. It can be regarded in no other light than as a local improvement, and must give way to the adoption of the true provincial policy of making the Saint Lawrence navigable for ocean-going vessels.

THE CHATS CANAL.

Westward from Ottawa, the rapids have a descent of six miles, and at their head the small town of Aylmer is situated. A navigation of 25 miles ensues in the Chaudière Lake, or as it is otherwise called the Lac des Chênes, where the Chats Rapids intervene to separate it from the Chats Lake, on which a navigation of 20 miles is obtained. It was at the last named spot that $373,191.98 was expended in the commencement of a canal to join the two reaches of water, with locks 200 feet long by 45 feet wide.

The reasons given for undertaking this work are utterly insufficient. The plea that the country on both sides of the river was becoming settled, and that the trade upon these two lakes had "correspondingly increased" are no arguments that the ordinary dictates of prudence should be rejected. But the reality is, that so far as population is considered, the country is very thinly inhabited, and the work is at least a quarter of a century before its time, bearing in view, the state of the Provincial Exchequer, and the many calls upon it. The condition of the Ottawa navigation can be considered in no other light than as a whole; and to depart from this principle is to seek difficulty. The limit of the Grenville and Carillon Canals has been stated. But independently of the expenditure to enlarge their capacity, the Chaudière Falls, at Ottawa, with 63 feet of lockage, including the upper rapids, had to be considered. Until these interruptions were overcome, the Chats Canal merely established a connection between the two lakes, and gave fifty miles of navigation which led nowhere: a mere insignificant part of the whole river, bounded to the east and west by a broken imperfect navigation.

There is an argument with regard to improvements of this character, which is always advanced by their supporters, who, as a rule, are generally those who are to derive benefit from them. It is that an improvement must be begun somewhere, and it is as well commenced at the particular point as anywhere else; and that to take it away from the natural point of departure is a guarantee that the remaining work will be carried out, for without further development, the particular structures will be valueless. This argument, in full, was adopted with regard to this canal. It was commenced in defiance of good judgment and right, owing it is said to the pressure put upon the Executive of the day by the members of the District, who bartered their support for the commencement of this ill-judged project. But it was never completed. The contract was given out, at prices wholly inadequate, and as the contractor notified the government that unless an advance was made upon the prices he could not proceed, the contract was amended, and the various classes of work were measured and estimated. The demand of the contractor was $367,161.40; the government engineer estimating the work at $274,108.63. The matter was referred to Mr. Killaly then assistant commissioner, who gave his opinion that $342,647.12 was a reasonable settlement. Mr. Shanly subsequently entered into the question and named $328,802.52 as the amount of work performed, no allowance having been made for plant.

The works remain suspended until the project of the Ottawa navigation be decided upon.

THE WELLAND BRANCH TO THE TOWN OF NIAGARA.

THE LATERAL CUT.

This is one of the schemes which has found favor with the politicians of the district, locally interested; but it must be summarily rejected by the public writer who examines improvements by the degree in which the whole Province will be effected by them, by the additions such works may make to the revenue, and by the influence they will have upon trade. The construction of this branch would only have the effect of diverting some of the traffic which is taken by Port Dalhousie, but it would not add to the total amount passing between the Lakes. The benefit would be purely local, and the project can in no way be identified with the general system of navigation. We are made acquainted with the proposed route by Mr. Walter Shanly, who was directed by the Town Council of Niagara to examine the feasibility of the project, in 1854; his Report is published in the Public Works Report for 1856. Mr. Shanly premises in describing it, that it should be the first step in a great ship canal, connecting Ontario with the upper Lakes, and he lays some stress on the advantage Niagara enjoys, in possessing a harbour of great space and ample depth of water, open the year round, demanding no outlay for construction or maintenance, and entitled to the preference over any artificial haven. "That in the north-" easterly gales which sweep the Lake for days, and some-"times for weeks together every spring and autumn, as well " as in the north-westerly and south-easterly blows which, " though of short duration, are violent while they last, the " mouth of the river stands unequalled as a harbor of refuge," adding that in south-westerly winds vessels have some difficulty in beating in, wind and current being both unfavorable.

Mr. Shanly's line runs from a small bay near the dockyard, and close to the north side of Fort George to Lock No. 25, above the Village of Thorold, the distance being 12⅛ miles, 10 of which are in a perfectly straight line, the mountain being ascended in the remaining distance by four curves. The cost is estimated at $4,000,000.

The distance from Thorold to Port Dalhousie, on the present Welland Canal, is about eight miles; therefore the "lateral cut" would prolong the canal navigation four miles, and would leave the condition and limit of the lake propeller precisely where it is; whereas the money expended on it would effect a complete enlargement of the whole Canal or at least very nearly so. Even if the St. Lawrence locks were not enlarged, this improvement would at once be sensibly felt, for the steamers and propellers which pass from Hamilton and Toronto could proceed to the Upper

Lakes; and were the latter given the foot of extra navigation which the Welland now possesses, very important changes would result.

It is very evident that the "Lateral Cut" can only be classed as a local effort to obtain trade at the cost of the Province; and in common with schemes of its character, it depresses by dissipating the public attention. Yet notwithstanding the purely municipal character of the survey, and that Mr. Shanly in the opening sentence of his Report, states he was professionally engaged by the Town of Niagara, and it is addressed to "J. Simpson, Esquire, Mayor," the expense was subsequently thrown upon the Province. In the Public Accounts, 1856, the item appears as a "Survey of "the proposed line of Canal to extend the capabilities of the Welland Canal," which really is a misrepresentation, and gives an entirely false idea of the work performed. Probably no one who has seen the item, even fancied that the amount expended was for the Survey of the Lateral Cut in 1854.

It is impossible to adduce one principle of right or justice to explain such a charge having been made on the Public chest; it is to be hoped that the proceeding will not be considered a precedent to follow in analagous cases, for it is utterly indefensible.

TORONTO AND GEORGIAN BAY CANAL.

Of late years a connection by canal between Georgian Bay (an inlet of Lake Huron) and Toronto, has been frequently advocated. At this moment it is prominently before the public, and the propriety of its construction is forcibly urged with something of an organization. Out of Toronto the main features are only generally known, and a certain extent of favor has been granted to it. When it is considered that the estimated cost is a little over twenty-two millions of dollars, we may be assured that before the work is authorized a very stringent enquiry into its necessity will be instituted. The estimated length is 100 miles. The course would run from the mouth of the River Humber, about five miles west of Toronto, and then ascend that river in a northerly direction to the level of Lake Simcoe, 470 feet above Lake Ontario; crossing by canal, the dividing ridge which separates it from the Holland River, by which it would continue on the same level to the Lake. An open navigation of 23 miles would cross Lake Simcoe to Kempenfeldt Bay, near Barrie; whence a communication would extend to the Nottawasaga River, by which it would descend to Lake Huron, 130 feet below Lake Simcoe. The size of the locks to be 265 feet long, 55 feet in width, and 12 feet lift. This width would allow two schooners of 400 tons each to pass through at the same time. It is now nearly twenty years since Mr. Kivas Tully* first made an exploration of the line of the proposed canal. On a second occasion, in 1851, he ran a line of levels to ascertain the elevation of the "Ridges" which form the water-shed between Lakes Simcoe and Ontario. Mr. Tully at once saw the difficulties to be encountered and the immense probable cost, and the subject was allowed to drop. Lately it has been revived, and its promoters urge, that the increase of the populationof the Western States and the consequent advance in agricultural wealth and commercial enterprise, call for increased canal accommodation. That independently of the positive view of benefits obtained, the loss of life and property on the St. Clair Flats and Lake Erie, is so great, that a large expenditure would be warranted in order to insure the avoidance of such disasters. On the 14th of September, 1855, a Convention of Delegates from the cities of Chicago, Milwaukie, Oswego, and Toronto, and the towns of Barrie and Orillia, met at Toronto, when the following resolution was unanimously adopted :—

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*I have to thank Mr. Tully for many acts of assistance during the period I have been engaged on this book; the more appreciated by me, and the more graceful on his part, as he is aware that I do not entertain all his opinions.

> "That the immense trade from the North-West demands the immediate construction of a Canal between the Upper Lakes and Lake Ontario, of sufficient capacity to pass vessels of one thousand tons burden from Lake Huron to Lake Ontario, at Toronto, or its vicinity."

The Convention further appointed Mr. Tully to survey and report on the route, associating with him Mr. Mason, an engineer of some reputation, of Chicago.

According to Mr. Tully's calculations, the Georgian Bay Canal, if constructed, would effect a saving in distance between Chicago and Liverpool of 837 miles, as compared with the route by Buffalo and the Erie Canal to New York; and 428 miles less than the route by the Welland Canal to Quebec. The saving in time to New York being, by Oswego, 50 hours, as compared with the Buffalo route, and to Quebec 36 hours, as compared with the Welland route: no notice being taken of the detention in passing the St. Clair Flats, which may be estimated at three days each way. It is further urged, that the average annual losses to shipping in the St. Clair Flats and Lake Erie may be taken at $1,000,000. The detention and loss in passing the St. Clair Flats attracted so much attention, that a charter was obtained in 1857 for the construction of a ship canal* from the St. Clair River to Rondeau, an estimated distance of 36 miles, to save 131 miles of hazardous navigation.

Mr. Tully is of opinion that the supply of water is abundant, not only for the Canal but also for extensive water power, and that all the materials required for construction can be easily obtained.

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* At a meeting held in Chatham in 1856, it was resolved,

"That this meeting is of opinion the St. Clair flats, over which in 1835, a com-
" merce of the value of £62,791,921 4s. 10d. currency, or $251,167,684 96c. passed,
" but with a damage of upwards of one million dollars, must always present a most
" formidable obstacle to an ever increasing commerce, and that the difference of opin-
" ions amongst the scientific men of the States as to the best means of removing the
" obstructions is sufficient of itself to indicate their serious nature, and the importance
" of the proposed work."

The estimated cost of the Rondeau and Chatham Canal was $6,000,000.

In point of revenue, it is estimated that about 3,000,000 tons would pass through annually, which, at forty cents, would yield $1,200,000.

All the advantages claimed by this work have been given in full. Owing to the clear and satisfactory reports of Mr. Tully, criticism is by no means difficult. He places the subject in a fair light, without exaggeration, and his conconclusions are in no way strained. There is reason to think that his figures may be accepted as a just and fair estimate. He has in no way concealed the formidable character of the undertaking of crossing the ridge. The cutting[*] extends for ten miles averaging throughout 90 feet in depth. It gradually rises to a height of 200 feet on a base of this length, and the apex of the triangle in the section is towards Lake Simcoe. Between Lakes Simcoe and Huron, the work extends six and a half miles with a cutting of 50 feet. Mr. Tully has performed his difficult task with much professional ability and in perfect good faith. Lake Simcoe, according to Mr. Tully,[†] is 130 feet above Lake Huron, and 475 above Lake Ontario. It is a large body of water, with many tributaries, and the question has not been raised that it would be insufficient for the supply.

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[*] There is reasonable expectation that great as may be the depth of excavation across the "Ridges," that there would not arise more than the usual impediments and delays experienced in removing large quantities of earth. The heighth of land between the sources of the Holland and Humber, in the Townships of King and Albion, trends generally in an east and west direction, and for the most part presents a similar surface character. According to Chapman, from the sections which are exposed at various points, it seems to consist of sand or gravel to the depth at least of 200 feet, filled with boulders of lime stone and gneissoid rock, many of which are of large size. This sand is interstratified with layers of comparative hard pan and with here and there beds of plastic clay. The latter is entirely of local occurrence; accordingly its presence at particular spots is more or less uncertain. It has been supposed that limestone rock runs through this section of the country. But that view has been clearly disproved; the supposed strata of limestone being merely a few detached glacial boulders of immense size. (*Canadian Journal, III.*, 357.) Little difficulty would be experienced in the excavation, did not clay intervene. But should it present itself, nothing can be more treacherous. In many of the Post Tertiary deposits. we know from practical experience that clay is much mixed up in quick sands, as is seen in the excavation of the "Deep Cut" in the Welland. But in the locality in question, from the known character of the material, little theoretical danger from slips is to be apprehended. Should rock crop up, it would not be available for building purposes, as it would consist in all probability of thin bedded or shaly sandstones of the Hudson River Group.

[†] *Vide* note Erie Canal, chap. IV.

The real argument is, What would the expense achieve? What influence would it exert upon the general commerce of the country?*

It may safely be replied that, as a solitary project, were the Canal constructed, not one vessel more would pass by the Saint Lawrence than goes by it to-day. The Georgian Bay Canal taken by itself can effect no purpose beyond raising the importance of Oswego and the route in that direction from Chicago. The capacity proposed is sufficient to establish that the one point aimed at is this connection. That is to say that the commerce which takes the Welland in one class of vessels, would pass by the Georgian Bay in much larger and accordingly much more profitable propellers. For this reason there might be a certain increase of tonnage which would follow that route; but in order to pay the interest of the investment, with the cost of management and maintenance amounting together to about one and a half million of dollars, an immense extent of business would be required. We must remember, that all the advantages sought, would be attained by the enlargement of the Welland, with the addition of having only twenty-eight miles against one hundred of canal by the Georgian Bay. The Saint Clair flats may be marked by objectionable features, but they are capable of improvement to obtain an increased depth. The project is simply to create a parallel line of navigation to an existing route, without advancing one Canadian interest. If the Chicago and Oswego forwarders, the only parties really interested, undertook to make the valleys of the Humber, Holland River and the Nottawasaga navigable, there could be no objection to extend facilities to their doing so, but for the Province to give land for the purpose, or in any way to advance it would be to create a rival to its own works. It is one of those schemes with many apparent advantages, to attract the local attention of the country where it would pass, all of which disappear when they are considered. Besides there are constantly a class of irreflective people who are dazzled by the prospect of an immediate expenditure of money, who never can be made to think that there is a day of payment, and that the annual charge of interest is felt in every article they use, and in much that they eat. Such as these are loud in their approval of this proposed canal, as they would be of any other work. But a large expenditure can only be warranted by a thoughtful consideration of its necessity. The one favorable result predicted by its supporters is the possible gain of some hours between Chicago and Oswego, which is denied by those who contend that the Welland Canal enlarged would achieve more satisfactory results. Thus this scheme is a matter quite *per se*, and in no way comes into the provincial improvement of deepening the whole chain of canals, and cannot for a moment be entertained until that work is thoroughly effected.*

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* There are few public men who have more closely studied the commercial relations of Canada than the Hon. John Young, of Montreal. His opinions are invariably well considered and liberal, and he may be looked upon as being identified to a great extent with the western trade. If he did not bring the first cargo from Chicago to Montreal, he brought one of the first, for the intercourse between the two places is of very late date. In 1854, only five British vessels arrived at Chicago. In 1855, there were 77, and in 1856, 110. The operations of Mr. Young in the Chicago market were continued for years. He argued in 1858 that out of fifty millions of bushels of grain and (flour reduced to grain at the rate of four and a half bushels to the barrel) received at Dunkirk, Buffalo, Suspension Bridge, Rochester, Oswego, and Ogdensburg, forty millions were received at Oswego and Buffalo, from the very facilities these places offer. In both cities, there is great storing capacity for wheat; some elevators being capable of containing four millions of bushels. The cost of storage for a period not exceeding a month, is half cent per bushel; and to transfer wheat from Lake to Canal craft is one-fourth of a cent per bushel. In Montreal it costs three cents per bushel to cart, store for one month and ship grain on board ocean vessels.

It is important to note Mr. Young's explanation of the causes which sustain Oswego in the struggle against Buffalo. It contains the very principle on which the enlargement of the whole system of Canals is claimed. Buffalo at the foot of the Lake Erie navigation, receives a Lake vessel of from 800 to 1000 tons, and transfers its produce to the canal boats of 210 tons in the Erie Canal. Oswego, tied to the dimensions of the Welland Canal must transact its business in vessels of 350 tons. But it possesses and properly estimates the advantage of offering 156 miles of navigation by the Welland Canal and Lake Ontario, limited though it be, against the 186 miles parallel contracted navigation by the Erie Canal. The prosperity of Oswego has been greatly enhanced by a communication with Lake Erie. In 1845, 44,560 tons of produce were delivered there; in 1862, 276,237 tons; and it would derive additional importance if larger vessels could bring increased cargoes. Accordingly it has much to hope for the enlargement of the Welland; or for the greater extent specified by the construction of the Georgian Bay Canal. Either result might possibly affect the commerce of Buffalo, but scarcely a ton of the trade the latter forfeited would pass the Lake. The Georgian Bay Canal is looked upon with favor, not that the Michigan propeller would be nearer to Montreal, but because she may come with larger tonnage and with greater rapidity to Oswego.

THE GEORGIAN BAY CANAL *via* LAKES SCUGOG AND SIMCOE.

The first public notice of this project originated with the County Council of Ontario, in 1863, when Mr. T. C.

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* As in these pages I have no end in view but the establishment of truth, I insert the argument advanced by Mr. Tully, in vindication of the claim of the Toronto and Georgian Bay Canal. It does not meet the theory, that the Erie Canal can be enlarged only to a certain extent; and it does not contemplate that sea-going vessels by the enlargement of the Canadian Canals could proceed to Boston, and thus do away at New York with the advantage it extends in the prices of ocean freights. I cannot but think that all the arguments of Mr. Tully distinctly establish that the project is purely one conceived to benefit Oswego, and in no way conducive to Canadian interests. Mr. Tully's memorandum is as follows:—

"As I understand the matter, the question to be answered is this: Will the enlargement of the Welland and Saint Lawrence Canals ensure the diversion of the western trade from the Erie Canal to the Saint Lawrence? I think not, for the following reasons. Judging by past experience it appears reasonable to suppose that the bulk of the western trade having passed the St. Clair River and reached the eastern end of Lake Erie, will find its way to New York by the Erie Canal. To compare distances, which is after all the most important consideration, apart from the question of lockage, it will be found that New York is 68 miles nearer to Buffalo than Quebec, which is taken to represent tidewater, the following figures demonstrate the distances:

"Buffalo to Troy by the Erie Canal	350 miles.
"Troy to New York by the Hudson River	150 "
"Total	500 miles.
"Buffalo or Port Colborne to Port Dalhousie	28 "
"Port Dalhousie to Kingston	190 "
"Kingston to Montreal	170 "
"Montreal to Quebec	180 "
"Total	568 miles.

"At New York, the produce of the West has arrived at the Atlantic Ocean, whereas at Quebec the Lower St. Lawrence and the Gulf have to be traversed a distance of about 800 miles before the Atlantic Ocean is reached. The distance from Quebec to Liverpool is however, 478 miles shorter than from New York, the respective distances being 2502 miles, and 2980 miles. Deducting 68 miles from 478 miles, the difference in distance from the eastern end of Lake Erie to Liverpool would be 410 miles; but the high ocean freights consequent on the supposed dangerous navigation of the Lower St. Lawrence, still concentrates the western trade at New York, and as the St. Lawrence and the Welland Canals have never been filled to their utmost capacity, whilst the Erie Canal is crowded, even after the recent enlargement, the inference is, that the enlarged Welland and St. Lawrence Canals would not divert the western trade: and should there be the slightest probability of such a result, the State of New York would immediately enlarge the Erie Canal in the same proportion, as a trade which annually requires the expenditure of $50,000,000 to transport it from the west to the seaboard is worth keeping.

"By the construction of the Georgian Bay Canal 428 miles additional would be saved in distance besides the annual losses on the St. Clair flats, which average about one million of dollars. I consider these advantages would alone divert the trade, which it is ussless to expect can be accomplished under any other circumstances."

Keefer was instructed to report on its advantages and practicability. Mr. Keefer acted in compliance with his instructions, but his report is unaccompanied by any estimate, so that a full comparison cannot be made between this and other proposed routes. In the following year, a Select Committee of Parliament was obtained to consider the project, of which strange to relate, it reported favorably; and suggested, "that when Parliament determines upon an "expenditure of money for a more complete survey of a "route for a Canal between Georgian Bay and Lake Ontario, "by the Simcoe Valley, the Scugog route should be preferred "to any other for this purpose." The reasons for appointing the Committee are concisely set forth, to the effect that there are four competing routes for a Canal from Lake Huron. 1st. By Lake Scugog, through the County of Ontario. The cost not estimated. 2nd. By the valleys of the Holland and Humber rivers, estimated by Mr. Tully at $22,170,750. 3rd. By the Trent River, the cost of which will probably be quite as much. 4th. The project of connecting Lake Huron with Montreal, *via* Lake Nipissingue and the Ottawa River, estimated by Mr. Shanly, for a ten feet navigation, at $24,000,000. It has been proposed, also, to enlarge the locks of the Welland Canal. Each of these schemes claims its peculiar advantages; but the leading object of them all is to attract to Canadian channels the products of the Western States destined for the Eastern sea-board.

Of the three Lake Simcoe routes, that of the Trent is inferior to the other two. It would give a length of navigation between Lake Huron and Lake Ontario of 200 miles; whereas the distance by the Humber route is estimated by Mr. Tully at 100 miles.

According to Mr. Keefer's plan, it is proposed to take the waters of Balsam Lake, 590 feet higher than Lake Ontario, as the summit level, making the total lockage

840 feet, being 500 feet in excess of the lockage of the Welland Canal, and 230 feet in excess of the Humber route. The length would be about 100 miles, and the cost about $22,000,000.

It is difficult to understand the hasty vote of the Committee, as the evidence in no way warrants the conclusion; and public attention should be directed to the proceedings of the Legislature, so that no survey of the route at public expense, is allowed to creep into the estimates. The whole question of the communication from Lake Ontario to Georgian Bay requires to be settled, as an abstract matter of principle. The superiority which any project may claim is, for the time being, purely a local question, and must be tested at the expense of the municipality or of parties interested. In no way can the cost be recognised as a legitimate expenditure of public money.

PROPOSED CANAL BY THE RIVER TRENT.

Before the Union, when Sir John Colborne was Lieut.-Governor, a large sum of money was expended on the River Trent. Locks 135 feet long, 33 feet wide, and 5 feet deep, with the accompanying dams, to obtain reaches of navigation, were built between Rice Lake and the Bay of Quinté; also at Peterboro', Bobcaygeon, and Lindsay. Until the introduction of railways, small steamers plied between Gore's Landing, on Rice Lake, and Peterboro'. The steamer "Ogemah" still continues tri-weekly trips between Chemung Lake and Fenelon Falls, connecting with the Port Hope and Lindsay Railway at Lindsay, and by stage a distance of six miles, with Peterboro'.

Further expenditure on this route was stopped in 1841, on the ground that the line of communication from the Bay of Quinté to Nottawasaga Bay required 820 feet of lockage, and that the depth of five feet of water through a series of lakes and currents, in a route extremely circuitous, was unsuited as a line, by which the produce of the Western States could be sent down to tide-water. The River Trent, below Peterboro', is now used as the means of conveying rafts of timber from the lakes in the rear of Peterboro' to the Bay of Quinté; and the Board of Works, excepting the lock at Bobcaygeon, maintain only some timber slides and dams on the river for that purpose. In 1863, the member for Peterboro' succeeded in obtaining a Select Committee to inquire into the advantages of this route as a means of communication between Lakes Huron and Ontario. The Committee did not report during that session; but although in 1864, the enquiry was renewed, the result has not been made public. There cannot be any doubt, however, that the decision of 1841 will be affirmed.

The same objections exist now which were ably urged by Mr. Killaly at that time, and we owe it to him that no more money has been wasted on this ill advised scheme. There is a schedule in the Public Works Reports which, in any other publication, might be ranked among the *facetiæ* of the hour. But grave documents are not appropriate for the exhibition of humor. It is however difficult to consider in a serious light a schedule setting forth "Public Works "incomplete and as yet unproductive, but on which tolls "are to be levied as soon as they are available." Under this head the Scugog inland navigation, is included at a cost of $484,123 61. It may even be regarded as a matter of good fortune that this sum is not twenty times what it is. It was estimated, that in order to complete the works to the extent originally proposed, two millions and a half dollars would be necessary; but it was considered that the amount was understated, and that at least a million dollars more would be required. It is impossible to explain how such works were originally authorised. For after proceeding upwards of 80 miles through this tortuous and insufficient navigation, the vessel would have been in Rice Lake just 10 miles from Lake Ontario. But the principle on which improvements should be conducted is so little known, and the rapacity of constituencies and politicians so great, that the absurdity of a project is not the least bar to its being entertained.

THE CAUGHNAWAGA CANAL.

This scheme from being identified to some extent with the Chambly Canal, has already been fully described under that head.* Further examination of it is not necessary here.

These various projects have been placed side by side, so that we can judge of their several characteristics. Dispassionate criticism cannot assign to any of them a place in a well considered Provincial policy. There is not one which can command more than local support, for there is not one which if consummated, will have any extended influence on the trade of the Province, and with one exception, they may be dismissed as having failed to impress public opinion.†

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* Ante p. 22.

† It would seem that there is another line to be added to the rival claimants for the Oswego trade. I adduce the authority of the *Hamilton Spectator*. The remarks which affirm this view, form one of the leading articles, (23rd February, 1865.) They are opportune to show to what extent zeal can put out of view almost insuperable difficulties. The direction of the route alluded to, would cross some of the highest land in Western Canada.

“ This periodical discussion of the Georgian Bay Canal, however, indicates the
“ longing which many cherish for a proper outlet from the Great West. The move is
“ right in so far as it shows restlessness for want of this outlet, and the only mistake
“ is in fixing upon the particular route. The Georgian Bay is frozen up for too great
“ a portion of the year, to warrant the expenditure requisite to construct a canal from
“ it to Lake Ontario. This is a fatal objection, and one which no amount of money
“ can do away with. Besides this, there will be, at least, twenty-five millions of cubic
“ yards to be excavated. much of it solid rock. It is true, the force of money could
“ overcome this difficulty, and were it not for the first named objection, it might be
“ worth the while going into the scheme. This feeling in favor of a canal connection
“ with the West has pointed to three other routes—the Ottawa and Georgian Bay, the
“ Trent Valley, and the Hamilton and Goderich. What we have stated as a fatal

That exception is the Ottawa Route, supported by the wealth of Montreal, and from the influence and high personal character of its advocates, almost certain to obtain universal favor in Eastern Canada. Without doubt, it will be brought before Parliament, with a demand for assistance. It must be opposed by Western Canada without compromise,* as secondary to the necessity of extending the navigation of the Saint Lawrence. Latterly it has been advocated under what are termed its military aspects. The arguments advanced to sustain this view, are as fallacious as the complaint uttered at the Chicago Convention of the defenceless condition of the Lake Erie cities.† Should war ever

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“ objection to the Toronto and Georgian Bay route applies equally to the Ottawa and
“ the Trent Valley routes, and we need not, therefore, further allude to them.

“ As to the construction of a canal between Hamilton and Goderich, or more
“ properly speaking, between Hamilton and Bayfield, for that is the true line, we
“ believe it is only a question of time. Nature points it out as the most feasible
“ and the most likely to be serviceable. There is not so much or so difficult excava-
“ tion to be done, and there would be about three months longer open navigation than
“ by Georgian Bay. The deepest channel of Lake Huron runs along the Canadian
“ side. This would secure water of a higher temperature for the canal; besides
“ which, it would be fed all winter long by running streams in the counties of Huron,
“ Perth and Oxford. Why do not onr canal friends turn their attention to this route?
“ They should do so, unless they are intent npon a purely selfish scheme, one, namely,
“ which is to benefit Toronto. The true Canadian outlet for the products and the trade
“ of the Western States, the Lake Superior region, and the North-West or Hudson's
“ Bay Territory, is by the course we have pointed ont, and we hope that such a truly
“ national project will receive that attention which it deserves from the Confederate
“ Government of the British American Provinces.”

*I pen this sentence knowing well that the Montreal supporters of the Ottawa Route, are men estimable in all the relations of life, with many of whom I have held friendly relations for years, and whom I continue sincerely to respect. The high standing of these gentlemen, and their admitted capacity, furnish the greater reason for Western Canada to oppose this project: for if legislation in its favor can by any means be effected, that success will be attained by the present advocates of the Ottawa route, who deservedly possess great influence.

“† Looking at the map of the Province, the most casual observer must be struck
“ by the straight line of water connecting Montreal with Lake Huron by the Ottawa
“ and French Rivers and Lake Nipissing, and conclude at once that this is the natural
“ line of communication between the sea and the lakes. Were it unobstructed, there
“ would be no question of it, and the greater part of the produce of the magnificent
“ grain-bearing States wonld be conveyed by it; whilst as a line of communication in
“ war time its distance from the enemy's frontier; its directness, the beautiful position
“ of Lake Nipissing at the Western end, forming a site for a dockyard, and of Ottawa
“ City as the future capital of Canada as a central arsenal, commend this route
“ strongly to the notice of the military observer. * * * Were this canal in exis-
“ tence, gun vessels could sail from England direct into Lake Huron, and thence they
“ might operate on Lake Michigan, gaining access through the Straits at Mackinaw.
“ Small ironclads could run the gauntlet down the St. Clair and Detroit Rivers into
“ Lake Erie, or, diverging from Ottawa City, might penetrate Lake Ontario at
“ Kingston and the Rideau Canal. Mackinaw would thus become comparatively

occur between England and the United States, and Canada be made the battle-ground, we may expect that on both sides the canals would soon be rendered useless. In the American, we would find both a shrewd and an enterprising foe. If the Ottawa Canal were completed, one of the first efforts made, would be to master the guard left to protect the entrance at Georgian Bay, the attack being regulated according to the contemplated resistance; and the dams and locks would be destroyed in a few hours. The incidental use of the military argument is to give importance to this route, the true value of which is commercial.

There is only one line of policy to be adopted with regard to the canals; a policy not simply beneficial to Western Canada, but one which will advance the well being of the whole country. At this moment we have no one generally accepted view with regard to the future. We see district struggling against district; the east endeavoring to obtain a monopoly of advantages; the west sensible of an inferiority, and taking no steps to remove it. There is no Provincial

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"useless to the Americans, and Lake Michigan would be sealed by a British blockading squadron. All that would be required would be a good harbor at the mouth "of the French River, Ottawa City to be properly fortified, Toronto, Hamilton and "Kingston on Lake Ontario; Port Stanley, on Lake Erie; Goderich and Collingwood "on Lake Huron as coaling depots, and to be fortified in the same way as commercial "harbours in Great Britain. Indeed with this canal we should be no longer apprehensive about the defence of the Western Peninsula, protected as it would be on its "flanks by the fleets. The only dangerous portion would be the Niagara frontier. "There, as in times past, we should be obliged to fight our land battles, and to "maintain a strong land force. Until this canal is made, British supremacy on the "sea is, therefore, virtually useless as far as Canada is concerned. Destroy a lock on "the Beauharnois Canal, another on the Welland, and Canada would be exposed to "an irruption of Americans, only surpassed by that of the Huns and Goths on the "Lower Empire, and Canada would be powerless to cope with them on the lakes. "While, therefore, we engage in a profitable commercial project we strengthen our "position for a time of war and render available for other purposes armies which would "be required to protect the present exposed canals. * * * The most feasible "way of getting the British navy into the lakes would be to bring them from England "to Montreal, there lighten them to 6 feet water, to enable them to pass through the "canal to Lake Nipissing. There they might be equipped and sent down the French "River ready for service."—*Montreal Gazette*, 14*th March*, 1865.

Mutatis mutandis, this is precisely the language held at the Convention, when the enlargement of the Erie Canal, at the expense of the general government, to pass gunboats for the defence of the cities of the western lakes, was advocated by the New York delegates. The motive of the declamation in both cases may be considered identical; the desire to sustain a purely commercial project, even if such *ad captandum* arguments revivify national prejudice and jealousy.

policy, which without advocacy of local interests, would have in view the development of the material prosperity of the whole, and at the same time an increase of the revenue of the public works. Our course of action is suggested by the magnitude of the trade of the Western States, which if turned into its natural outlet, the Saint Lawrence would lead to the important results all yearn to effect. We can gain this trade, if we improve the Saint Lawrence and deepen the canals to 15 ft., and construct a chain of locks 250 ft. by 45 ft. wide. Here is the true policy for us to pursue. If we fail to follow it, we neglect every advantage, geographical and commercial which we possess; we shall continue unchanged, and remain discontented and impoverished. If we develop it with ordinary skill and energy, we may hope for better days, for competence, prosperity and contentment.

CHAPTER IV.

THE ERIE CANAL.

So much mention has been made of the Erie Canal, that a description of it to some extent is indispensable. The importance of that work, the great part it has acted in the settlement of the Lake States, and the position which it occupies in relation to the Canadian Canals, in the competition for the carrying trade of the North-West, suggest the enquiry, if it has reached its maximum development, and if the accommodation it extends can be increased. It is not to be expected that a diversion of the trade from the Hudson would be effected without great effort on the part of New York to retain it; and such effort would take the form of increasing the Erie Canal, if possible so to do. No expense would be spared to create a channel for commerce, which should extend every requirement sought for; and which by the advantages it possessed, would have the effect of preventing that commerce from seeking other favorable routes. Means such as these, alone can control the relations of trade. Repressive laws to some extent may act as a restraint; but under their operation, enterprise withers, and the desired end is still remote and unpossessed. Only by freedom of action, and by wise and considerate adaptation of means to an end, can we attain great results. The one course open to New York to draw within the State the trade of the West, and to enjoy the manifold benefits which are blended with it, is to create a route to the sea, as a whole without a rival, and which it would be matter of necessity, for it would be a matter of interest to pursue. There is no such thing as nationality in trade. Produce from the West will seek the East by the most profitable route; and there is no legislation which can interfere with the Saint Lawrence, so long as it is free to the flags of all nations, and at the same time offers the greatest inducements for freight to follow it. The Canal System of New York is wonderful in extent; a description of it, is a history in itself. The relations of the West however, are confined to the Erie Canal, and the Oswego Branch; and it is on their efficiency as channels for produce, that the cost of transport depends. It is notorious that their present dimensions are unequal to the trade; and propositions have been put forward to increase the size of the locks, in order to admit vessels of greater tonnage, and by these means reduce the cost of freight, and lessen the period of navigation.

It is to be anticipated that many projects perfectly impracticable* will be advocated; and a general principle may be advanced, that the accommodation to be attained is purely a matter of cost. The problem can not so be stated. There is much in canals, as in other matters of practical economy, beyond the power of money to achieve. If it were purse weighed against purse, between New York and Canada, it must be admitted that Canada would come out the loser. If every improvement which Canada could offer could be anticipated before completion, by an increase of advantages extended by New York, it would be useless to enter into the contest. But if New York, from the physical features of the country, and from a contracted supply of water, can not carry out an extended improvement; if, without an expense totally disproportionate to the end, water cannot be brought from Lake Erie, it is plain that the limit of enlargement to the Erie Canal is soon reached. On the other hand the Saint Lawrence Canals can attain a development, which the river navigation would point out, be the maximum what it may.

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* It is the importance of a work, which gives rise to any extravagance that may be expressed in relation to it. Few examples of wilder speculation exist, than with regard to the well known project of the Panama Canal, to connect the Atlantic and Pacific oceans. Having passed some months of my life in the mountains of New Granada when the project was under discussion, in common with everybody then there, I paid some attention to it. We all used to wonder how the Cordilleras would be cut through. One theory which was very freely advocated was, that as the tide rose at Manzanilla and at Chagres on the Atlantic three feet, and as the rise at the Pacific was eighteen, a cut adapted to the Pacific level, would furnish all the water necessary. Without an immense reservoir, even had the scheme been practicable, the supply would not have lasted an hour. Another serious proposition was to tunnel through the mountains. The only suggestion worthy of consideration was made by Colonel Totten; and it was to take the Chagres River at a high level as a summit, turning in its tributaries as accessory feeders, and to look down to both oceans. This river at Cruces runs in the centre of the Isthmus, but the dividing ridge at the sources of its tributary the Obispo is much nearer the Pacific. From my recollection of the country the work would be very heavy. There is no doubt that a certain navigation in this way could be obtained, but at very considerable cost. It is a question, however, if a sufficient supply of water, for vessels of even moderate tonnage could be counted upon in the dry season. The Obispo was quite dry, at this period of the year, which I cannot call summer, for summer was perpetual. The Panama trail crossed it, when free from water; and on more than one occasion California emigrants were swept away, and drowned by freshets. These rushes of water come with such rapidity that it is impossible to avoid them; and the dry beds of rivers in an incredibly short space of time become the depositaries of wide and deep streams. I, myself, was witness to a freshet in the Rio Grande on the Pacific side, where in a few minutes a depth of water from five to six feet, was pouring over previously dry ground like the tail-race of a mill dam. Being on the wrong side for my purpose, the native who was with me and myself, had considerable difficulty in getting to the opposite bank, and we were nearly carried away.

The general opinion on the Isthmus, with men of any reflection, certainly with the engineers of the Panama Railway in my time, was, that a ship canal is an impossibility from the want of a sufficient water supply. Yet the project finds its advocates among capitalists, and men of observation, because it would confer benefit; and is periodically brought forward as a practicable, because a desirable scheme.

The Erie Canal has its entrance at Buffalo, and passes along the Niagara River some twelve miles to the entrance of Tonawanda Creek, which has a width of 200 ft., with a depth of 9 ft. It follows the creek, on the Lake Erie level to Pendleton, where the canal proper commences ; but no change is made in the level for a further distance of 7 miles to Lockport, where the first descent is made, 56 ft., by five combined locks. This reach is continued a distance of 31 miles ; to Rochester 93 miles from Buffalo, and 7 from Lake Ontario, above the height of which the canal here is 265 ft. Independently of the Lockport lockage, the upper waters of Tonawanda Creek, are forced into Oak Orchard Creek, and by the latter passed into the Canal at Medina. At Rochester, a further supply is received from the Genesee Valley Canal, with its Dansville branch, 124¾ miles in length. Two sources of supply thrown into the branch canal, the Oil Creek Reservoir, and the Ishua Creek are

1489 ft. above tide water. Another reservoir exists at Rockville; and one of the forks of the Genesee is made available for it at Caneadea. A feeder is turned in at Wiscoy; a feeder at the Canese-raca Creek; another at Allen's Creek. The Genesee River is also made subservient to the main canal at Rochester. Whether this lateral supply could be increased or not, is not important, as all the requisite water thus far, can be obtained from Lake Erie. The canal continues a further distance of 49 miles, entirely dependent on the lockage supply, descending 118.5 ft. to 390.36 ft. above tide water, which is the lowest level between Buffalo and the Rome reach, and accordingly at the eastern ascent from this level, the Lake Erie supply ceases. The end of the reach Port Byron is situated 26 miles to the west of Syracuse, where the junction with the Oswego Branch takes place on a reach 10 ft. higher. The distance from Buffalo is 158 miles.

The canal having left the Lake Erie summit, has to depend for a water supply on what can be gathered. There is a further claim upon it beyond the necessities of the canal itself, for the Cayuga and Seneca Canal; in which there is a lockage of 13 ft. downwards to the Seneca River, and 12 ft. to the Cayuga Lake. Both Crooked and Seneca Lakes might with some expense be applied as feeders. For the former is 718 feet, and the latter 441 ft. above tide water. Whereas the lowest level of the Erie Canal is 390 ft. above; on the other hand Cayuga Lake is 378 ft. above. The succeeding 26 miles from Port Byron to Geddes contains a minor summit, as at Geddes there is a descent to Syracuse of 6 ft., to a height of 400 ft. above tide water; and on the other hand from Geddes going westward to Jordan, the level is 406.86 ft. whence it descends to the low level at Port Byron. This distance is fed by the Skaneateles and Camilla Lakes, and by the Weedsport feeder. It is from these resources that the Oswego branch has likewise partially to be supplied.

The Oswego branch is 38 miles in length, and descends 155 ft. to Lake Ontario* with 18 locks 110 ft. long, by 18 ft. wide. It is by this communication that the Western produce, which has passed through the Welland, finds its way to New York. The original locks were 14 in number, 90 ft. long, and 15 ft. wide. The canal was completed December 10th, 1828, having cost $565,437. The enlargement was consummated in 1862, at a cost of $2,511,992, so the total cost of the Oswego branch by the report of the State Engineer of New York, is $3,077,429.

From Syracuse to York Mills is a distance of 53 miles; this reach forms the second main summit. It is severely taxed. For it is the head level of 166 miles of the Erie Canal, and the Oneida Lake Canal. The Black River Canal discharges itself at Rome, and contributes to feed the main Canal. The Chenango Canal, equally a source of limited supply, has its connection in the succeeding reach at Utica, on a level 3 ft. lower. This reach is 13 miles long. Both cities derive their prosperity and importance from this geographical advantage. The reservoirs of the former are obtained from the stream which bears its name, and from Chub Lake, 700 ft. above the level of the Rome reach. The summit of the Chenango Canal is 76 miles from Utica, and 703 ft. above the canal. All the water that can be gathered has been carefully collected. The Orville feeder at Butternut Creek; the DeRuyter reservoir turned into Lime Stone Creek, thence to the canal; the Chittenango feeder from Erieville reservoir, Cazenovia Lake, Cowaselon Creek feeder, Oneida Creek feeder, Butt's Creek feeder, Mohawk feeder, are the various sources of supply.

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* American Engineers make Lake Ontario at Oswego 323.35 feet lower than Lake Erie at Buffalo. These figures do not agree with our calculations; but as I am describing an American work, I follow the official report concerning it. I learn from Mr. Frank Shanly, who from his connection with the Welland Railway has paid particular attention to the level of Lake Ontario, that the water in 1858, was higher than shown by any known previous record. In that year there was a depth of 16 feet 2 inches on the mitre sill of the entrance lock at Port Dalhousie, whereas it is known to have been as low as 10 feet 6 inches at that point. In Canada, we generally consider that the main height of Lake Ontario is 330 feet below the level of Lake Erie.

Lake Huron is 7 feet above Lake Erie. Bayfield places it considerably higher. But the former level has been proved to be correct by the independent labors of the engineers on the Northern Railway to Collingwood, Georgian Bay; by the operations on the Buffalo and Lake Huron Railway at Goderich; and on the Grand Trunk Railway to Sarnia at the foot of Lake Huron.

The canal descends from the Rome reach a distance of 113 miles, 426 ft. to the Hudson at Albany. In its course thither it is supplied by the Ilion Creek feeder, the Mohawk Little Falls feeder, the Rocky-rift feeder from the Mohawk and the Rexford feeder. At West Troy, 7 miles from the Albany basin, it receives the Champlain Canal, which has likewise an independent entrance to the Hudson.

The construction of the Erie Canal was authorised 15th April, and commenced 4th July, 1817. It was completed 26th October, 1825. The estimated cost was a trifle below five million dollars; the actual cost of the original canal was $7,143,789. It was 363 miles in length, and consisted of 83 locks, 4 ft. deep, 90 ft. long, and 15 ft. wide. The lockage was 675.5 ft. The enlargement of it was authorised 11th May, 1835, but was not commenced until August, 1836. It was completed September, 1862. The estimated cost of enlargement was $23,400,000; the actual cost, $31,834,041. The length of the new canal is 350.5 miles, with 71 locks, 7 ft. deep, 110 ft. long, by 18 ft. wide. The lockage is 654.8 ft. The total cost of the canal is $38,977,830.

The present locks admit boats 17 ft. 6 wide, and 98 ft. long, with 6 ft. draught, carrying from 210 to 220 tons cargo.

It is seen by this description, that the supply from Lake Erie is only available to Port Byron, 158 miles from Buffalo; that two summits succeed in the remaining 192 miles, which are taxed to feed beyond the Erie Canal, the Seneca and Cayuga Canal, and to a great extent the Oswego and the Oneida Canals. At the low ground of the Cayuga marshes, west of Montezuma, the canal is carried onward by a stone aqueduct 894 ft. long, on which the bottom of the canal is 36 ft. lower than the reach at Rome, 53 miles long.

With these physical conditions, it certainly is evident that the improvement of the canal is limited to one phase, the enlargement of the locks. Any well considered examination of the facts here presented, must shew the utter impossibility of converting it into a ship canal. Beyond a given distance, Lake Erie can furnish no supply; and without the waters of the lake, it appears that there is no means of gathering a store, sufficient for a canal of double the dimensions, for it would exact eight times the present amount of water. Various modes of getting over the difficulty have been suggested. One plan is, to widen the 158 miles to Port Byron, so that the high level would possess the capacity of furnishing beyond the uses of the Canal, a supply for an independent feeder; the latter carried by an aqueduct over the low ground at Cayuga to the Rome reach, 44 miles. A second, to place large steam pumps at Port Byron, at Jordan, and at Syracuse, and to transfer the water from level to level. The third, to remedy the difference of level by artificial structures, so that Lake Erie became directly the feeder throughout. It may be doubted whether these schemes are practicable: or if so, at what cost could they be carried out? Certainly not without the lavish expense of untold millions. At Syracuse the canal ascends to 426.96 above tide water; going westward, the distances and levels which succeed are:

Syracuse to Geddes,	2 miles,	400	feet	above	tide water.
Geddes to Jordan,	17 "	406.86	"	"	"
Jordan to Port Byron,	9 "	401.36	"	"	"
Port Byron to Clyde,	16 "	390.36	"	"	"
Total......	44 miles.				

Thus, in this distance the level is from 20 ft. to 36 ft. below the Syracuse and Rome reach, which is 53 miles long, and indifferently supplied with water.* It is estimated that for a traffic of 300 lockages per day, 18,800 cubic feet of water per minute are required. The various feeders theoretically give 24,550 cubic feet. The supply from the Erie Canal in the upper reach is calculated as 35,000 cubic feet per minute. Accordingly there is little water in excess of what is needed for the present navigation. It is husbanded with great care: fresh reservoirs are constantly sought, and an extended supply is the source of careful and earnest enquiry. The official reports betray the anxiety felt in this respect. The calculations of what will be hereafter required are not without a certain tinge of special pleading. They are based on the principle, that although the tonnage will increase, the lockage will be really less than at present; for each cargo being double what it now is, the concentration of freight will diminish the number of vessels carrying it. The amount of supply required by the Canal with the enlarged locks is set down at 23,111 cubic feet per minute, and it is claimed that it can be obtained by the development of the present resources, and by additional reservoirs. The opinion however has been expressed, that the increased volume is by no means a matter of certainty on the Rome level; and the perusal of the several reports does not instil a full unenquiring conviction that the doubt is without foundation.

The difficulty of further development is admitted by the State of New York. The only improvement considered attainable, is the construction of locks 220 ft. long, and 26 ft. wide, with the same depth of channel as at present, by which means a superior class of vessel could navigate the canal. The locks themselves would exact much more than double the quantity of the water supply which is now demanded. The vessels which at present pass by the Erie Canal can carry 7000 bushels of wheat, 210 tons. The enlargement would admit vessels propelled by steam carrying from 18,000 to 20,000 bushels of wheat. Mr. Benton, Canal Auditor, (1862,) is specific on the impossibility of obtaining greater depth. "Any change from "6 ft. draft of water, and an elevation of the bridges over "12 ft. above the present surface line of the water would "be impracticable where the canal passes through our cities "and villages. No satisfactory estimate can ever be made "of the cost of such a change."

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* "The undersigned starts with what seems to be admitted on all hands, an in-"sufficient supply of water on that level (the Rome or long level of the Erie Canal) "for the present purposes of navigation and that this insufficiency will be increased "with the increase of business and to lockages." *Mr. J. Skinner, Canal Commissioner—Annual Report, State Engineer,* 1862 *p.* 395.

The canal debt of New York is $25,000,000; and if the canal revenue sinking fund is deficient, the payment of the interest is raised by taxation. New York, therefore, would not be inclined materially to increase her debt, except under great pressure. The State Engineer, in 1862, examined into the practicability of constructing one tier of locks through the Erie and Oswego Canals, and his estimate was, as follows for locks 150 ft. × 26 ft.:—

Erie Canal	$2,815,900
Oswego Canal	625,500
	$3,441,400

The attempt has been made to throw the expense on the general government, on the ground that the change would be an adaptation to naval defence. Accordingly an act has been passed by the New York Legislature, that when the United States shall provide the means, either in cash or in bonds, redeemable within 20 years, the Canal Board shall put the work under contract without delay. The manifest insincerity of the claim, needed special effort to give it the character of validity; and we find that the notice to terminate the Convention with Great Britain, with regard to armed vessels on the lakes, pressed upon the Executive at Washington as a consequence.

We have in the above limit the maximum of enlargement hoped for, and it is based on the admitted fact, that increased depth cannot be attained. If sufficient water can be brought to the Rome Reach to admit of large locks, and double the present quantity would be indispensable for the same number of lockages; a vessel drawing 6.3, and entering the chamber of a lock 220 ft. long, with a width on the guards under 26 feet, is all that can be attained.

The cost of this improvement is really a very formidable matter, and sufficiently explains the disinclination of the New York Legislature to undertake it. A detailed estimate has been furnished; the enquiry having been extended to making the structures of stone—of stone and wood—and of wood. As it would be wretched economy to build them of anything but stone, it is necessary only to refer to the figures under that head. We learn that the cost of alteration would be:

The Erie Canal..............	$11,902,888 15
Oswego Canal..............	2,503,000 00
Total................	$14,405,888 15

By making the connection between the Hudson and Lake Ontario at Oswego, and enlarging the locks to that extent only, the sum of $4,000,000 would be saved. The land damage is estimated at:

Erie Canal.....................	$425,000
Oswego Canal..................	90,000
Total..................	$515,000

But by only enlarging the Erie Canal to Syracuse the amount would be $295,000.

In addition to the above, the estimate of deepening the Canals one foot is:

Erie Canal	$1,789,900
Oswego Canal	150,000
Total	$1,939,900

And to deepen the Canal one foot from Albany to Syracuse and Oswego only, is named at $950,700.

It is considered that the work can be completed in two years.

Accordingly no new element would be introduced in the trade relations of the West and New York. With the canal enlarged, transhipment would be made as now at Buffalo and Oswego, and freights would be diminished in cost by the larger description of canal vessel. The Province accordingly can calculate the competition to be experienced. On the score of energy, the rivalry can be scarcely augmented; but the wealth of New York cannot achieve impossibilities. The Erie Canal is a remarkable effort under any aspect, and its projectors have overcome difficulties almost insuperable. But the forty years it has been in operation, have plainly shewn the capacity to which it can be extended, and at the same time have taught where effort must cease. There is every reason to think that in point of depth its finality is attained, and that no sea-going vessel will ever descend from Lake Erie to the Hudson.

CHAPTER V.

TOLLS, REVENUE AND TONNAGE.

After a period of twenty years, we ought to be able to infer something definite of a series of public works, but with regard to the St. Lawrence Canals, there is still some misapprehension and a general incapacity properly to estimate them. The consideration of their revenue may throw some light on the subject, and aid in demonstrating their commercial value. For the moment it is desirable to limit the examination, to what return these Canals have made as investments of capital; and if it be established that they fail to yield a remunerative rate of interest, then to show the reasons of failure. By these means we may evolve one of two conclusions; whether the cause of non-success is permanent and impossible to be reached; or whether it is temporary and only the result of explicable phenomena. The view, that without an improvement of the water navigation, Canada would have not attained the progress she has reached, for the moment is entirely set aside. For it is only by applying a severe test to the remunerative character of an enterprise that it can be fairly judged. A recollection of indirect positive benefits, has a tendency to warp the judgment, in the examination of direct results; and with respect to the Saint Lawrence Canals, we must remember that as projects they were regarded in themselves as good paying investments, quite distinct from all social and political development which would arise from them. The main argument advanced for embarking in the enterprise, was the anticipated income, they would annually yield.

We can best satisfy ourselves in this respect by a careful consideration of past results, putting them in such a form that we may generalize what deductions they present, keeping in view, the end it is proposed to attain. For any purposes of utility, no statistics exist until 1849. The introduction of them are wholly and entirely due to Mr. Hincks.* Until his advent to power, in 1848, the Customs Returns were included in the Public Accounts, and no statement was given concerning the Canals beyond their Revenue, and the charges against it; and in some instances the invariable annual cost to the Province. If any information does at all exist, it lies in the archives of the Public Offices, in a very crude shape, it may be inferred, quite valueless for reference. The accounts and public documents before this date, as they appear in the appendices to the Legislative proceedings, give but general and limited information. It is hazardous to advance a negative proposition, but it may be said that no information is to be derived from them. For my part I could find nothing to guide me, although I looked through them with fair industry. The first Trade and Navigation Returns are those of 1849, and they are far from the full and satisfactory Returns of the following years. In 1850 the present system was inaugurated, each year being continued with more or less improvement. It is not therefore possible to go back earlier than this date.

On the other hand, the Public Accounts furnish the Revenue obtained from the Canals; and as the money is admitted to have been received in the Treasury, and the

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“ * In this investigation (the Welland Canal Inquiry) there was employed as
“ accountant a young man of whose abilities Mr. Mackenzie conceived a very high
“ opinion; so much so, that he remarked to him, that he ‘should be glad to see him
“ ‘Inspector General of Public Accounts for Upper Canada.’ But he added with
“ sleepless suspicion, ‘The only question with me is, whether you would be proof
“ ‘against the temptations of the position.’ That accountant was Francis Hincks.
“ He was afterwards Inspector General for United Canada, and leader of the Govern-
“ ment; then Governor of the Windward Islands, and is now Governor of British
“ Guiana.”—*Lindsey's Life of Mackenzie, Vol. I.,* 349.

payments for repairs and management in the gross paid out, so far as they go, the Schedules must be held to be reliable. What is deficient is the necessary detail to shew what construction and repairs have been made. The argument in the preceding chapter with regard to a proper estimate of cost, has sufficiently explained the basis of valuation, to make allusion to it unnecessary in this place. All that is required, is, to recapitulate the cost of the Canals* and to calculate the interest at six per cent, which would represent the amount each should pay clear of all expenses, for the investment to be considered reasonably productive :—

Chambly Canal	$480,816 00	
Saint Ours Lock	144,553 79	
		$625,369 79

SAINT LAWRENCE CANALS.

Lachine Canal	$2,229,774 13	
Beauharnois Canal	1,331,787 95	
Cornwall	1,827,249 62	
Williamsburg	1,222,904 03	
		$6,611,715 73
Welland Canal	$6,500,000	
		$6,500,000
		$13,737,085 52

We may accordingly consider that for the Canals to be held in estimation, as paying interest on the capital expended in their construction, the net revenue should be in round figures:

Chambly Canal	$ 37,000
Saint Lawrence	397,000
Welland	390,000

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* In the St. Lawrence and Chambly Canals I have retained the minor figures, according to the calculations, but have rejected them in the Welland, a course which to some extent is inconsistent. But as in each case the operation is given, by which the amounts are attained, the affected exactness in the former instance will not mislead. I fear that it is not possible to attain a nearer approximation. Nevertheless, I consider the attempt should be made by competent and conscientious accountants, to compile as accurate a statement as possible. Further, I think that the publication of it when complete would be useful for future guidance.

The amount they do pay, will be seen by reference to the following schedules compiled from the Public Accounts. They show the Annual Receipts and Expenses, and Net Revenue until the close of 1863. The incomplete state of the accounts for 1864 does not admit of the details of that year being included.

ANNUAL RECEIPTS, EXPENSES AND NET REVENUE OF THE SEVERAL CANALS.

CHAMBLY CANAL.

Year.	Gross Revenue.	Management and Repairs.	Net Revenue.	Annual Cost.
	$ cts.	$ cts.	$ cts.	$ cts.
1841	....	....	218 55	....
1842	....	....	286 06	....
1843	1,409 03	1,096 05	312 98	....
1844	1,368 40	2,136 30	....	767 90
1845	711 68	2,090 44	....	1,378 76
1846	953 60	1,713 63	....	760 03
1847	1,907 73	2,324 53	....	416 80
1848	1,744 28	1,505 44	238 84	....
1849	6,574 55	1,745 76	4,828 79	....
1850	11,572 25	2,158 70	9,413 55	....
1851	7,379 85	7,684 08	....	304 23
1852	7,480 13	9,110 53	....	1,630 40
1853	8,277 43	6,930 76	1,346 67	....
1854	6,539 81	8,432 69	....	1,892 88
1855	10,121 25	7,745 88	2,375 37	....
1856	11,352 80	10,859 26	493 54	....
1857	12,191 07	17,987 10	....	5,796 03
1858	11,375 05	14,382 93	....	3,007 88
1859	16,132 54	15,575 11	557 43	....
1860	18,942 16	17,631 15	1,311 01	....
1861	10,211 43	14,110 52	....	3,899 09
1862	12,863 08	17,922 99	....	5,059 91
1863	25,263 51	16,080 15	9,183 36	....

ST. OURS' LOCK.

Year.	Gross Revenue.	Management and Repairs.	Net Revenue.	Anuual Cost.
	$ cts.	$ cts.	$ cts.	$ cts.
1849	855 73	25 00	830 73	....
1850	295 55	554 59	259 04	....
1851	260 51	1,244 60	....	984 09
1852	284 53	1,204 10	....	919 57
1853	367 09	1,500 00	....	1,132 91
1854	267 79	3,436 83	....	3,169 04
1855	302 76	3,790 65	....	3,487 89
1856	276 03	5,680 60	....	5,404 57
1857	294 37	9,685 31	....	9,390 94
1858	299 33	2,094 91	....	1,795 58
1859	388 05	1,955 95	....	1,567 90
1860	366 14	4,644 13	....	4,277 99
1861	328 92	3,376 90	....	3,047 98
1862	217 98	2,752 79	....	2,534 81
1863	336 49	3,623 63	....	3,287 14

ST. ANNE'S LOCK.

Year.	Gross Revenue.	Management and Repairs.	Net Revenue.	Annual cost in excess of revenue
	$ cts.	$ cts.	$ cts.	$ cts.
1842	....	....	....	....
1843	2,475 20	621 12	1,854 08	....
1844	6,243 10	768 60	5,474 50	....
1845	6,105 60	1,609 11	4,496 49	....
1846	5,975 95	1,010 81	4,965 14	....
1847	3,826 55	757 10	3,069 45	....
1848	3,778 69	799 25	2,979 44	....
1849	3,669 10	738 63	2,930 47	....
1850	3,229 31	772 05	2,457 26	....
1851	2,807 45	772 45	2,035	....
1852	3,093 69	875 01	2,218 68	....
1853	3,703 10	1,105 73	2,597 37	....
1854	4,264 94	1,489 00	2,775 94	....
1855	4,389 18	3,257 46	1,131 72	....
1856	5,058 68	4,824 78	233 90	....
1857	4,549 67	1,623 22	2,926 45	....
1858	4,958 41	1,588 24	3,370 17	....
1859	5,659 17	1,566 53	4,092 64	....
1860	504 43	2,382 01	....	1,877 58
1861	12 00	2,325 58	....	2,313 58
1862	....	2,863 88	....	2,863 88
1863	5,013 64	1,196 80	3,816 84	....

RIDEAU CANAL.

Year.	Gross Revenue.	Management and Repairs.	Net Revenue.	Annual Cost.
	$ cts.	$ cts.	$ cts.	$ cts.
1855	13,938 55	None given.	13,938 55	....
1856	10,604 37	“	10,604 37	....
1857	11,172 20	“	11,172 20	....
1858	9,375 85	30,717 64	....	21,341 79
1859	10,743 90	32,322 73	....	21,578 83
1860	250 14	23,807 85	....	23,557 71
1861	543 51	21,318 16	....	20,774 65
1862	25 90	25,128 46	....	25,102 56
1863	7,685 16	23,505 53	....	15,820 37

GRENVILLE AND CARILLON CANALS.

Year.	Gross Revenne.	Management and Repairs.	Net Revenue.	Annual Cost.
	$ cts.	$ cts.	$ cts.	$ cts.
1855	Not given.	Not given.	....	....
1856	“	“	....	....
1857	“	“	....	....
1858	“	“	....	....
1859	“	“	....	....
1860	600 32	10,092 16	....	9,491 84
1861	....	7,295 68	....	7,295 68
1862	....	7,425 68	....	7,425 68
1863	8,340 70	9,040 78	....	700 08

SAINT LAWRENCE CANALS.

Year.	Gross Revenue.	Management and Repairs.	Tolls Refunded.	Net Revenue.	Annual Cost above Revenue.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1841	56,525 99	19,725 99	....	36,800 00	....
1842	65,288 75	29,706 27	....	35,582 48	....
1843	29,288 42	9,010 73	....	20,277 59	....
1844	35,748 99	8,532 95	....	27,216 04	....
1845*	23,332 89	18,633 89	....	4,699 00	....
1846	33,674 01	21,809 45	....	11,864 56	....
1847	61,502 90	32,266 09	....	29,236 81	....
1848	58,158 85	45,882 19	....	12,276 66	....
1849	68,793 53	33,876 61	....	34,916 92	....
1850	81,572 16	40,700 41	....	40,871 75	....
1851	115,250 41	46,074 81	....	69,175 60	....
1852	88,077 26	51,056 76	....	37,020 50	....
1853	102,410 76	57,137 69	....	45,273 07	....
1854	110,109 53	70,473 80	....	39,635 73	....
1855	74,791 60	89,262 94	....	....	14,471 34
1856	85,818 63	82,821 49	....	2,997 37	....
1857	71,468 37	87,103 63	....	....	15,635 26
1858	79,072 64	82,680 69	....	....	3,608 05
1859	72,866 06	70,829 46	....	2,036 60	....
1860	21,546 52	76,433 16	295 91	....	55,182 55
1861	29,159 13	75,021 96	132 05	....	45,994 88
1862	22,406 14	75,071 41	....	....	52,665 27
1863	119,416 22	69,361 94	824 18	49,230 10	....

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* The Cornwall and Beauharnois first appear as items in the Public Accounts of 1845, as follows:—

Cornwall Revenue £51 12 5; Management £200 8 2.
Beauharnois do 64 8 3½; do 311 0 7¼.

WELLAND CANAL.

Year.	Gross Revenue.	Management and Repairs.	Tolls refunded.	Net Revenue.
	$ cts.	$ cts.	$ cts.	$ cts.
1841	80,843 95	6,780 65	....	74,063 30
1842	Not given.	....	....	....
1843	64,637 20	1,188 53	....	63,448 67
1844	104,538 59	77,676 70	....	26,861 89
1845	79,546 09	23,845 69	....	55,700 40
1846	89,640 30	10,963 33	....	78,676 97
1847	122,199 53	48,623 01	....	73,576 52
1848	116,257 45	60,531 25	....	55,726 20
1849	138,967 74	24,998 79	....	113,968 95
1850	151,703 53	28,047 54	....	123,655 99
1851	201,841 33	47,694 30	....	154,147 03
1852	233,093 51	59,743 54	....	173,349 97
1853	269,915 90	91,922 24	....	177,993 66
1854	208,304 30	105,915 55	....	102,388 75
1855	225,839 93	131,582 10	....	94,257 83
1856	272,081 93	110,807 60	....	161,274 33
1857	239,312 65	116,110 25	....	123,202 40
1858	223,024 79	112,330 87	....	110,693 92
1859	139,442 55	87,053 34	....	52,389 21
1860	160,720 00	72,776 55	119 46	87,823 99
1861	241,775 94	63,350 35	53,280 50	125,145 09
1862	280,278 62	67,765 43	75,594 40	136,918 79
1863	240,899 95	62,841 04	5,338 23	172,720 68

The above tables enable us to trace present results.

Taking the revenue of the Chambly Canal in connection with the Saint Ours' Lock, for they form one system of navigation, we find the return something less than one per cent. on the cost, as is shewn by deducting the charge of the latter from the revenue of the former.

Chambly Canal, net revenue, 1863...	$9,183 36
St. Ours' Lock, excess of expenses....	3,287 14
	$5,896 22

The Saint Anne's Lock cost

Before the Union	$19,860 02
Since the Union	71,191 01
Total..................	$91,051 03

Therefore taken alone it may be looked upon as paying something less than 4¼ per cent. on the cost of its construction. But it cannot be considered apart from the Ottawa navigation, for it forms the eastern entrance to it. It is possible, that eventually the Ottawa canals may pay no small sum to the Provincial Exchequer. But great improvements are called for in the Grenville and Carillon Canals. The subject requires to be carefully examined, before any opinion worthy of attention can be given with regard to them. At present they do not pay their expenses, and they are a charge upon the Province. It is to be feared that they will remain in this condition for some years.

The Saint Lawrence Canals in 1863 paid about ¾ per cent.

The Welland something over 2½ per cent. on the construction cost.

The following schedules set forth, the tonnage of property and of vessels passing up and down the canals during the last sixteen years. With some variations, on the whole, there has been throughout a steady increase.

YEARLY TONNAGE OF VESSELS AND GOODS PASSING THROUGH THE SEVERAL CANALS.

CHAMBLY CANAL.

Year.	PROPERTY.			VESSELS.			Total Tonnage up and down Vessels and Property.
	Tonnage Up.	Tonnage Down.	Total Tonnage.	Tonnage Up.	Tonnage Down.	Total Tonnage.	
1848	....	....	18,835	....	....	22,322	42,157
1849	....	....	77,216	....	....	128,642	205,858
1850	103,564	5,477	109,041	69,468	73,726	143,194	252,235
1851	47,602	63,124	110,726	41,429	49,262	90,691	201,417
1852	81,745	5,769	87,514	41,623	40,995	82,618	170,132
1853	102,518	11,067	113,585	56,110	54,059	110,169	223,754
1854	63,013	20,234	83,247	36,544	37,783	74,327	157,574
1855	101,419	16,065	117,484	67,737	69,064	136,801	254,281
1856	107,878	21,788	129,666	74,374	76,696	151,070	280,736
1857	112,634	21,053	133,687	77,676	80,388	158,064	291,751
1858	105,806	20,839	126,645	79,808	80,015	159,823	286,668
1859	143,447	33,246	176,693	99,509	98,543	198,052	374,745
1860	177,881	39,236	217,117	117,037	122,489	239,526	456,643
1861	75,480	40,759	116,239	59,609	63,085	122,694	238,933
1862	117,608	30,693	148,301	77,854	76,698	154,552	302,853
1863	222,512	30,807	253,319	138,790	133,838	272,628	525,947

SAINT ANNE'S LOCK.

Year.	PROPERTY.			VESSELS.			Total Tonnage up and down Vessels and Property.
	Tonnage Up.	Tonnage Down.	Total Tonnage.	Tonnage Up.	Tonnage Down.	Total Tonnage.	
1850	97	59,733	59,830	74,201	50,101	124,302	184,132
1851	10,940	94,984	105,933	59,841	42,566	102,407	208,340
1852	11,434	87,620	99,054	60,777	47,972	108,649	207,703
1853	14,270	122,889	137,159	69,224	57,080	126,304	263,463
1854	19,037	101,032	120,069	82,360	71,996	154,356	274,425
1855	14,285	112,076	126,361	76,919	74,271	151,190	277,551
1856	10,784	158,617	169,401	90,179	87,507	177,686	347,087
1857	10,425	138,420	148,845	92,683	84,273	176,956	325,801
1858	11,839	142,605	154,444	93,563	89,167	182,730	283,147
1859	13,843	74,853	88,696	104,526	98,600	203,126	291,822
1860	14,852	189,722	204,574	119,884	112,307	232,191	436,765
1861	15,133	183,964	199,097	112,650	107,025	219,675	418,772
1862	11,763	216,333	228,096	121,910	119,819	241,729	469,825
1863	14,221	226,149	240,370	160,644	157,629	318,273	558,643

OTTAWA AND RIDEAU CANAL.

Year.	PROPERTY.			VESSELS.			Total Tonnage up and down Vessels and Property.
	Tonnage Up.	Tonnage Down.	Total Tonnage.	Tonnage Up.	Tonnage Down.	Total Tonnage.	
1858	not	given.	224,241	not	given.	310,226	534,467
1859	56,088	416,417	472,505	160,004	163,217	323,221	795,726
1860	27,692	316,387	344,079	187,330	185,003	372,333	716,412
1861	39,679	173,812	213,491	86,416	247,741	334,157	547,648
1862	153,407	183,973	337,380	190,322	183,003	373,325	710,705
1863	145,381	214,647	360,028	201,754	74,407	376,161	736,189

SAINT LAWRENCE CANALS.

Year.	PROPERTY.			VESSELS.			Total Tonnage up and down, Vessels and Property.
	Tonnage Up.	Tonnage Down.	Total Tonnage.	Tonnage Up.	Tonnage Down.	Total Tonnage.	
1848	....	....	164,267	....	....	467,875	632,142
1849	....	....	213,153	....	....	444,640	657,793
1850	75,969	212,134	288,103	230,581	229,599	460,180	748,283
1851	120,779	329,621	450,400	262,281	263,929	526,210	976,610
1852	110,415	382,160	492,575	300,575	284,891	585,466	1,078,041
1853	174,656	386,945	561,601	313,981	305,418	619,399	1,181,000
1854	203,623	458,990	662,613	379,554	357,570	737,124	1,399,737
1855	122,205	419,049	541,254	335,672	319,832	655,504	1,196,758
1856	131,430	503,106	634,536	367,142	347,899	715,041	1,349,577
1857	134,382	459,270	593,652	351,324	338,707	690,031	1,283,683
1858	110,807	494,751	605,558	386,790	371,020	757,810	1,363,368
1859	130,590	481,178	611,768	396,790	368,846	765,636	1,377,404
1860	130,248	603,348	733,596	416,680	407,785	824,465	1,558,061
1861	127,485	759,423	886,908	518,582	490,887	1,009,469	1,896,377
1862	135,443	828,951	964,394	537,455	511,775	1,049,230	2,013,624
1863	119,600	775,533	895,133	515,435	520,874	1,036,309	1,931,442

WELLAND CANAL.

Year.	PROPERTY.			VESSELS.			Total Tonnage up and down Vessels and Property.
	Tonnage Up.	Tonnage Down.	Total Tonnage.	Tonnage Up.	Tonnage Down.	Total Tonnage.	
1848	....	....	307,611	....	....	372,854	680,465
1849	....	....	351,596	....	....	468,410	820,006
1850	91,962	307,638	399,600	277,222	309,878	587,100	986,700
1851	174,893	516,734	691,627	368,151	404,472	772,623	1,464,250
1852	183,099	559,961	743,060	444,164	450,029	894,193	1,637,253
1853	245,832	659,684	905,516	480,096	583,528	1,063,624	1,969,140
1854	208,589	588,621	797,210	469,200	478,538	947,738	1,744,948
1855	220,012	629,321	849,333	491,364	560,103	1,051,467	1,900,800
1856	276,919	699,637	976,556	594,266	584,980	1,179,246	2,155,802
1857	245,256	655,816	901,072	582,282	566,149	1,148,434	2,049,506
1858	195,144	659,968	855,112	582,406	566,365	1,148,771	2,003,883
1859	186,608	523,003	709,611	418,922	437,996	856,918	1,566,529
1860	177,796	766.288	944,084	623,762	614,747	1,238,509	2,182,593
1861	154,888	865,595	1,020,483	677,028	650,644	1,327,672	2,348,155
1862	231,366	1 012,408	1,243,774	738,606	738,236	1,476,842	2,720,616
1863	390,822	750,298	1,141,120	669,919	660,178	1,330,097	2,471,217

In 1851, the tolls were divided into seven classes. Modifications both as to classification and rates, were made in 1853, 1858, and 1859; and in the latter year, wheat and flour were reduced to their minimum rate.

The following table represents the changes and reductions since 1850, so far as they affect cereals which form the bulk of descending freight, placed in juxtaposition with the tolls on the Erie Canal, imposed per ton.

The ascending freight is given for class 5, which includes coffee, furniture, earthenware, molasses, sugar, ships stores, wines and spirits, tobacco, &c.; class 4 including hardware, and ironmongers' goods, is five cents lower. Iron and coal are included in class 3, and are rated with corn and wheat.

AVERAGE TARIFF OF TOLLS IN EACH YEAR.

Year.	Erie Canal.		Welland Canal.	St. Lawrence Canals.	
	Up.	Down.	Up or down.	Up.	Down.
	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.
1850	4 80	2 92	0 60	0 45	0 37½
1851	4 40	2 19	0 45	....	....
1852	2 92	2 19	....	....	....
1853	2 92	2 19	....	0 36	0 30
1854	2 92	2 19	....	....	....
1855	2 92	2 19	....	....	....
1856	2 92	2 19	....	....	....
1857	2 92	2 19	....	....	....
1858	1 46	1 46	0 30	0 30	0 25
1859	0 70	1 41	0 20	....	0 22
1860	1 40	1 41	0 02	....	....
1861	1 40	1 76	....	....	....
1862	1 40	1 70	....	....	....
1863	1 40	2 10	0 20	0 25	0 15
1864	1 40	2 10	....	....	....

Wheat and flour were included in a different classification to corn, paying five cents more per ton until 1863; when wheat and corn were placed in the same category apart from the flour, which still pays the additional five cents both in the Welland and Saint Lawrence Canals. The figures given in the table shew the toll on wheat per ton.

The experiment of removing the tolls, and making the canals free was tried in 1860, and has to be taken into much account in the consideration of the future policy of the Province. It was dictated by the hope of increasing the through traffic of the canals, and by these means extend the commerce of the country. It has not succeeded in doing so. The "boon conferred," as it has been called, made no change in the proportion of produce of the Western States seeking the Saint Lawrence. Perhaps, however, the experiment was a legitimate one; for without it, it would not have been possible to speak with confidence of the result. We know now positively, at some cost it is true, that the question of tolls is a secondary one. They play an unimportant part in the direction of the trade; and it is possible that they might at once be somewhat raised without injury to any interest. Any such increase would be of unmitigated benefit to the revenue; as not a fraction of expense is involved in it. This proposition may raise a momentary outcry; nevertheless, it is worthy of consideration, especially if the effort to improve the navigation end in failure. It is true that the forwarder is pushed hard by railway competition; and that he deserves consideration from the Executive. At the same time the Province has the right to demand a fair equivalent for the use of the canals. It is proved that little is gained by reducing this equivalent below its legitimate value; and it is only justly established by weighing these manifold considerations.

The canal tariff of 1860, came into operation on the 19th May, by an order ot Council, enacting that vessels passing through the Welland Canal should pay the regular tolls, but that ninety per cent of the amount should be refunded whenever such vessel entered the Saint Lawrence Canals, or reported at any Canadian port on the lake and river. That vessels coming up through the Saint Lawrence Canal should pay only ten per cent of the Welland tolls. The Saint Lawrence Canals were free.

It was held that this course would direct the carrying trade to Canadian channels, and that although the revenue derived from the tolls would be lost, the incidental advantages arising from an increased trade would be more than an equivalent for the sacrifice. Likewise that the revenue would be advanced by increased imports paying increased customs duties so that in the end the Provincial exchequer would not suffer. Reasoning such as this, is only an indirect affirmation that the non-success of the canals lies in the high tolls;

and although the fallacy may be now every where repudiated, it was an opinion not long back generally advanced, and certainly unhesitatingly proclaimed. Analyzed and submitted to the test of experiment, it cannot even find place in the doctrines of expediency. It is now understood that the forwarder can pay a moderate toll, a proposition so simple and just, as to seem to be above doubt. Likewise it was a known and admitted fact that the Saint Lawrence to Montreal, was a cheaper and a better route than the Erie Canal to Albany. Accordingly, the disadvantage incident to the former could not be in the cost of transport, and had to be sought for in some other influence. The main case has long been understood to be the more favorable route of the Erie Canal and the Hudson for produce to the Eastern States and to European Markets. The reduction of tolls in no way advanced the claim of the Saint Lawrence, nor has their remission benefitted either the producer or consumer, for freights were higher when the canals were free than they were previously. The consequence has been an abandonment of revenue for three years amounting in the aggregate to about six hundred and fifty thousand dollars; the whole advantage of which has been enjoyed by the forwarder.

The tolls were re-imposed in April, 1863, by an order in Council issued by proclamation. No resolutions approving the expediency of the measure were submitted to Parliament. Some change was made from the schedule of 1859. On the Saint Lawrence canals the rates up and down were equalized on the ground that high tolls on the up trips had driven freights to the railway. On the seventh class a great reduction was made in the article of lumber. The Welland Tolls were increased from the rates of 1859; classes 3, 4, and 5, being each raised five cents, by which wheat and flour, paid that additional rate per ton. Wheat, however, from being placed in a different class, was continued at the toll of 1860.

In reviewing the operations of the measure, the question is not so much the quantity sent by the Saint Lawrence as the proportional quantity transmitted. The tolls having been remitted for the purpose of obtaining an increase of traffic, if the desired end had been gained by the concession, the result would show that freights had been drawn from other and opposing routes; consequently any excess in the Canadian Canals over preceding years, would mark a corresponding decrease on the Erie. Beyond this the ocean shipments would distinctly establish the preponderance in favor of the Saint Lawrence. We learn by the Buffalo Board of Trade Report, that of 136,329,524 bushels Western Breadstuffs distributed by the various routes for exportation, little more than 16,000,000 arrived at Montreal in 1862. The Montreal Board of Trade, in the *brochure* issued by it in support of the "Ottawa and French River navigation projects," furnishes the following statement up to 1862. 1863 is extracted from the Buffalo Board of Trade Report for that year. 1864, I give on the authority of Mr. E. H. Walker* of the Buffalo press, who has been good enough to furnish me with the approximate quantities previous to publication:—

Year.	Total quantity of flour and grain sent eastward from the Lake regions, to various distributing points.	Quantity sent via Montreal.	Per centage of the whole.
	Bushels.	Bushels.	
1856	57,707,769	5,811,877	10
1857	44,111,299	5,315,552	12
1858	58,872,566	5,332,481	9
1859	44,354,225	3,902,897	8¾
1860	78,639,436	6,782,135	8½
1861	120,741,851	16,575,765	13½
1862	137,772-441	18,041,839	13½
1863	116,367,548	13,742,671	12
1864	81,252,000	9,604,000	11

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* Commercial Reporter for the Buffalo *Commercial Advertiser*.

The Buffalo Board of Trade Report, 1863, with some slight variation in the figures, shews proximately the same results.

STATEMENT, showing the variations in the movement of the surplus crop of cereals Eastward, from 1856 to 1863 inclusive:

Years.	Flour, bbls.	Wheat, bush.	Corn, bushels.	Other grain, bus.
1856	3,865,442	19,505,358	14,282,632	4,592,569
1857	3,397,954	16,763,285	8,779,832	2,256,914
1858	4,499,613	21,843,850	10,495,554	5,035,097
1859	3,760,274	16,865,708	4,423,096	5,264,051
1860	4,106,057	32,334,391	18,075,778	7,712,032
1861	6,533,869	46,384,144	29,524,628	10,656,116
1862	8,433,037	51,220,529	32,998,049	11,286,109
1863	7,782,920	36,513,952	24,955,885	15,983,111

Reducing the flour to bushels of wheat, calling each barrel of flour equal to five bushels of wheat, the following table sets forth the total Eastward movement from the Lake Regions, in bushels, and the receipts at Buffalo, for the years indicated:

Years.	Total Eastward movement.	Receipts at Buffalo.	Buffalo per cent of total movement.
1856	57,707,769	26,239,791	45.5
1857	44,789,851	20,052,689	44.8
1858	59,872,566	28,219,855	47.1
1859	44,354,225	22,215,425	50.0
1860	78,652,486	37,133,461	47.2
1861	119,264,233	61,460,601	51.5
1862	137,669,872	72,794,188	52.8
1863	116,367,548	64,603,690	55.6

STATEMENT, showing the proportion of receipts at the principal receiving points, from 1858 to 1863 inclusive:

Locality.	1858.	1859.	1860.	1861.	1862.	1863.
Buffalo	47.1	50.0	47.2	51.5	52.8	55.6
Oswego	19.2	17.1	21.7	15.5	13.3	12.4
Montreal	9.2	8.7	9.2	12.6	13.09	11.8
W. Ter. B. & O. RR.	6.5	5.7	2.4	3.0	2.9	3.6
W. Ter. Pa. C. R. R.	4.3	4.2	3.9	4.1	4.4	5.2
Ogdensburg	6.0	5.8	3.5	3.1	3.42	3.48
Dunkirk	3.4	5.6	4.2	3.8	4.1	3.0
Suspension Bridge	2.0	0.7	6.5	5.4	5.1	4.5
Cape Vincent	1.8	1.3	0.8	0.6	0.7	0.35
Rochester	0.5	0.9	0.6	0.1	0.19	0.17
Totals	100.0	100.0	100.0	100.0	100.00	100.00
Per cent. of receipts at Buffalo & Oswego	66.3	67.1	68.9	67.0	66.1	68.0
Leaving for all other Points	33.7	32.9	31.1	33.0	33.9	32.0

Of the amount of grain delivered at Buffalo, including flour, a very considerable portion has been carried to Eastern markets by the two great through lines of railway, the New York Central and New York and Erie.

Certainly, we have the whole case in this comparison, and it establishes that the traffic on the Canadian Canals partakes only the general increase, following a law of progression, and varying with other waves of commerce. As at the same time a parallel event has been witnessed on the Erie Canal, the conclusion cannot be evaded that the trade of the Canadian Canals really received no stimulus from the remission of the tolls. The grain trade of the North-West* has attained such gigantic proportions that much of it is of necessity literally forced by the lakes and the Saint Lawrence, even with the present insufficient inducements. To take it toll free is to abandon the enjoyment of the revenue it should bring, without in any way diminishing the cost of carrying it. There must be a great modification of the resources of this continent, and of the commercial relations they create, before the necessity is admitted, that the channels to the seaboard, either through Canada, or by the State of New York, shall be free of all toll. Indeed the New York Legislature has been lately considering the propriety of raising the tolls, in order to obtain the necessary means for enlarging the locks on the Erie Canal; a proof of its confidence, that no opposition, as at present constituted, can take the trade from the Hudson. The measure, however, has miscarried, and the bill has been thrown out. Consequently, it would not be a matter of surprise, if an increased agitation were fomented, to prevent a renewal of the Reciprocity Treaty; and to enforce the necessity of placing gunboats on the lakes, so that the general government at Washington may be driven to effect an internal improvement for which the New York Legislature is unwilling to pay.

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* This result has been attained in little more than a quarter of a century. The first shipment of grain from Chicago was made in 1838. The earliest bill of lading known bears date 8th October, 1839.

CHAPTER VI.

THE REMEDY, AND ITS CONSEQUENCES.

We proceed to consider the canals as forming a system of inland navigation, and to enquire, if incompleteness, and deficiency of development can be adduced as causes of their unsatisfactory monetary condition.

In one sense, the canals as they exist, have fulfilled the purpose of their construction. They have established a connection with the sea-board, and extend to Western Canada, a cheap route by which produce may be exchanged for manufactures and the necessities of civilized life. In the season of navigation, they admit steamboats, rendered by modern art so luxurious, that the river is ascended and descended as a recreation. Such manifold results might almost be assumed as satisfactory and complete. So far as the tourists' ease is in question, nothing is to be desired; for the vessels which pass from Montreal to Toronto can be little improved. Nevertheless although the canals open to us a communication, by which we can send away what we have to sell, they do not pay the interest of their cost. Canada produces for exportation wheat, oats, Indian corn, barley, peas, flour, copper ore, petroleum and lumber; and vessels built in the Province. These are the main articles. The whole of them mostly come from Western Canada; excepting the latter, which we cannot build, for Lake Erie is a *mare clausum* to sea-going ships of large tonnage. That lucrative branch of industry is confined to Quebec. Every year the value steadily increases, and for the last eight years the annual total has been as follows:—

1856	$32,047,017
1857	27,006,624
1858	23,472,609
1859	24,766,981
1860	34,631,890
1861	36,614,195
1862	33,596,125
1863	41,831,532

There has been this value of produce sent from the Province, over the quantity necessary to sustain life, grown and imported under the Reciprocity Treaty. In Western Canada, one of three consequences ensues; the produce changes hands before it leaves the frontier, or it is taken by the Erie Canal to New York, or it follows the Saint Lawrence by the canals, and is shipped for Europe in sea-going vessels at Montreal. There is no comparison between the two water routes from the lakes to the sea-board, The advantage is entirely on the side of the Saint Lawrence, in every respect. The cost of transport generally speaking is about one-half. There is a difference of ten days time in its favor; and it is estimated that the slowest means of transport and the least cost, is as rapid as the best on the Erie Canal. The Saint Lawrence vessels are of much greater capacity, and in every point of view the superiority is maintained. One would consider, that with all these advantages, the Saint Lawrence would command not only the trade of Western Canada, but also the commerce of the upper American lakes. On looking at the geography of this portion of the continent, the natural outlet for the whole territory certainly appears to be by the river, and it would be inferred that no other would be followed; that by it supplies would be received, and exports transmitted; and that all effort to turn the commerce of the West from the river would be impossible. But the Saint

Lawrence is not followed; and the vessels which bear the cargoes of cereals deposit them at the American lake ports for transfer to smaller craft, which descend the Erie Canal. The Hudson is therefore the highway, and New York the port of the West.

There are many causes to explain this phenomenon; and it has been the long study of a few observing men to penetrate it. In divining the cause, they discern the remedy. It is conceded, that a ton of freight in any form soever, arrives at Montreal from a given point in the West, at half the cost of transport paid for its transfer to New York. On the other hand, freights from New York to Liverpool are always less than freights from Montreal to Liverpool; as a whole, it results that it is more profitable to ship from New York. While the navigation is kept at the present limit, the relative cost will be maintained, and the system will be unchanged. The reason is evident. New York, from the imperfections of the Saint Lawrence, is the importing market for the West, and consequently there are numerous vessels to bear away the produce delivered for export. In Montreal the number of vessels is limited. In the former case vessels seek for freights, and competition induces cheapness. In the latter the freight seeks vessels, and high prices are maintained.

It has been* further urged that independently of all other causes soever, the higher rates of insurance incident to the navigation of the River and the Gulf ot St. Lawrence and the expenses of pilotage and towing, combine to make the freight of a barrel of flour to Liverpool from Montreal from 25 to 35 cents more than from New York: and that so long as the bulk of Canadian exports exceeds that of the imports, the home freights by the Saint Lawrence must continue high; that this difference must always exist, for should the freight of the Western States shew any tendency to seek the Saint Lawrence, the State of New York, whose interests are identified with the Erie Canal, would reduce its tolls, to make competition impossible, as if the preponderance of a route could be decided by the relative cost of tolls. When the shipper at Chicago finds it to his benefit to sail down the Saint Lawrence and bring back a cargo to be discharged at his own wharves in the bottom in which it was loaded at the shipping port of the manufacture, the concession of passing through the Erie Canal toll free, will be but of secondary importance. The Saint Lawrence extending the maximum of its navigation must become the highway for the West, which no opposition can weaken, and no petulent legislation injure; for independently of its length and accommodation, it would add the special recommendation that with a superior class of vessels accidents would be very rare.

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* By Mr. Trautwine.

It is something like perversion, not to take account of this commerce, which, although without Canadian jurisdiction, has an equal interest in the Saint Lawrence, as the channel by which it ought to seek the ocean. Nevertheless, we occasionally hear the extreme view, which denies that the interests of Canada would be advanced through an enlargement of the navigation; and that as the Western States would alone be benefited, it is inexpedient to increase the Provincial debt, for their gain. They could well afford to pay for any convenience they would enjoy through our effort; and our share of the profit would present itself in an augmented revenue, which would pay more than the interest of the cost of the public works. So that by judiciously applying the annual surplus, we could in no distant time entirely cancel the original debt.

The present inequality of freights so far as Canada is concerned, is established by the tables of Trade. They shew where one ton goes up, from four to five come down. Such is generally the case in agricultural countries. The exports exceed imports of equal value, in bulk in the proportion of about four to one. As a consequence there are not vessels to take the freights, or they must come out in ballast to do so, and in either case freights must rule high. The importations into Canada for the last six years, when railway construction had proximately ceased, were:

1858	$29,078,527
1859	33,555,161
1860	34,441,621
1861	43,046,823
1862	48,600,633
1863	45,964,493

Of which the following amount came by the Saint Lawrence:—

1858	$10,795,077
1859	11,472,754
1860	13,527,160
1861	16,726,541
1862	17,601,019
1863	16,439,930

While the exportations by the Saint Lawrence are in value:—

1858	$ 8,983,773
1859	8,400,096
1860	13,288,135
1861	17,607,744
1862	14,411,849
1863	16,391,172

But independently of the difference which would arise between the bulk of the imports and exports, seeing that those which pass in and out of the river, are nearly the same value, Montreal merchants have, of late years, dealt largely in Western grain, which they have moved from the Lakes in British bottoms. Against this accession of freight, large quantities of produce have found their way to the

United States under the operation of the Reciprocity Treaty, increasing from $4,071,544 in 1851 to $15,063,730 in 1862. In vain do we look for imports by the River for the West. The importations do not come by the Saint Lawrence. Chicago and kindred cities turn to New York alone, and it is there that all the importations are delivered to be sent forward by the Erie Canal. To change this system would be to change the entire relations of the two cities; for if any circumstance soever could lead to the delivery of this freight by the Saint Lawrence, the vessels would be ready at the port where they discharged, to take cargoes to Liverpool, and the price of home freights would at once be reduced. There can only be one mode by which this end could be attained, and it is the avoidance of transhipment; not simply from its cost, but from the bearing of the Revenue laws of the United States. Vessels can profitably take the Saint Lawrence only on condition that they can go through to the lake port; and then necessarily they would bring back what now goes by the Erie Canal and the Hndson River to New York. The demands for freight on British vessels would be limited to Canada produce, much of which might possibly be carried by the sea-going propellers of Illinois and Michigan. From the limit at present imposed on the sea-going vessel by the Saint Lawrence above Montreal, no voyage above that port can be profitably made by the shipper. This fact must be borne in mind, as a result empirically determined. Accordingly the Western States seek the harbor of New York, not by choice, but by necessity. The importer of the Lake States of the Union, did he desire to import by the Saint Lawrence, would be undersold by his neighbor, who had brought in goods by New York. The Treasury regulations of the United States operate entirely to the advantage of the Hudson; for the customs duties are calculated according to the goods' value at the country of manufacture. But at Montreal, owing to the necessity of transhipment, the

√ duty would be levied on the value of goods there. No distinction of this character could be made, if a Western propeller could pass and return by the Saint Lawrence. The impatience with which the Western operator chafes under the restraint is well known. The experiment of the Dean Richmond was made to get rid of the incubus; and it failed from the small tonnage of the vessel. The value of the present route is of little account, owing to the narrowness of its character. It is inferior to the opposing channel through the State of New York, from this deficiency, and no inducement is held out to the shipper or the merchant to turn to it.

The captain of the "Dean Richmond," Mr. C. D. Pearce, appeared before a Committee of the House of Assembly in 1858, and gave some interesting details of his voyage. They are valuable from practically proving what can be effected. Mr. Pierce left Chicago on 17th July, passed by the Saint Lawrence through the Straits of Bellelisle, and arrived at Liverpool 17th September. He thus describes his voyage. "We were," he says,

DAYS.	HOURS.		MILES.
2		in Milwaukie shipping cargo.	
10	2	to Port Colborne, Welland Canal.......	1,000
3	15	passing Welland Canal.................	28
6		to Prescott............................	250
6	3	through St. Lawrence Canals to Montreal	110
1	5	to Quebec (towing)....................	180
29	1	in a distance of.......................	1,568
6	4	at Quebec for repairs.	
27		to Liverpool...........................	2,500
62	5		4,068

The six days detention between Prescott and Montreal arose from the necessity of lightening the vessel to less than 9 ft. draught, an operation which was repeated in each canal; the Beauharnois not being so deep as the Cornwall, and the Lachine not so deep as the Beauharnois, according to Mr. Pierce. The cost was estimated at $250. No difficulty was experienced in the navigation of the Gulf, "as the charts of Captain Bayfield are so perfect, that any "competent mariner may take a vessel out or in without "the aid of a pilot." The "Dean Richmond" is a square rigged vessel, and labored under the disadvantage of drawing too much water for the trip. Any reader of Mr. Pierce's account will concede that the period of transit was prolonged by these causes at least twelve days, and we may accordingly infer that a sailing vessel could with ease navigate the Saint Lawrence between Chicago and Liverpool in 50 or 60 days.

The commerce of the North-West is not any fanciful speculation, nor is its magnitude in any way questionable. It is a reality, as enquiry will establish. It has outgrown the Erie Canal, and the complaint of the West is that the quantity carried is so immense that carriers can command their own terms. The condition of the producers of the West has been described without exaggeration, as that of men, "shut out from the markets of the world, oppressed by "the excessive productions of their own toil, which remain "wasting and worthless upon their hands, depriving labor "of half its reward, discouraging industry, and paralysing "enterprise." Yet the prosperity of the West dates from the construction of the Erie Canal. Indeed the existence of these States may be traced to it, for no one of them can refer to more than forty years of settlement. It is the commerce of this region within that period, which more than any other influence has raised New York to its present wealth. The form in which the contribution has been made, is what can generally be observed between the sea-port and its dependencies. The imports for the West are delivered at New York. It is there that bulk is broken and the magazine of supply established. All cereals are delivered there for transfer to the East, or for shipment by the ocean; a tax is levied on every bushel of grain. Accordingly, every interest has received a stimulus, and a large city has grown up to be at the same time the London and the Paris of this continent. The feeling however is strong, that this profit has been derived at the expense of the West, and there is an unwillingness longer to submit to the exaction.

There is only one mode by which these aspirations can be satisfied; by the creation of enlarged channels of communication. In many remote localities the produce is even without value, for it is without a market. It is estimated that 500 million bushels of Indian corn or maize are raised in the North-West, but not five per cent. of this amount finds its way to the sea-board owing to the expense of getting it there; and that out of the sixty cents paid in New England for a bushel of corn, only nine cents go to the producer, the remainder being expended in freights and commissions. So plentiful is produce in Iowa, that it has been said, that it is cheaper to burn corn for fuel than to pay seventy-five cents for the labor of cutting a cord of wood. To bring this produce to market, is to give it a value it does not now possess.

It is this sense of an inferiority of position which has hitherto led to great discontent in the west; for while Canada evinces its present indifference, New York will still control the carrying trade, and the Erie Canal will defy competition. There is no necessity to nurse a commerce, which has surprised the world by the constancy and rapidity of its increase, unless there be the possibility that it will seek other channels; and although the Hudson offers the best route to the west, it is not the less unsatisfactory and exacting. We can therefore readily understand, why in the North-west, public attention has been turned to the Mississippi. There is a desire to improve the Illinois and Des Plaines Rivers, and to enlarge the Illinois and Michigan Canal, to a navigation of locks 350 feet long, 75 feet wide, and 7 feet deep, so that a more ample outlet may be obtained; and by turning to the Mississippi to prevent the trade passing by the St. Lawrence, and accordingly retain it in the hands of the United States. Nevertheless the increase of accommodation is peremptorily insisted upon. It has been argued that it is a national duty of the central government to extend it; that in reality the national exchequer would be no more than temporarily taxed. That the import duties collected on the return cargoes purchased by the proceeds of exported food, now denied a market, would not only pay the interest of the cost of the works, but would eventually pay the capital itself. This surplusage of grain accounts for the extended pork trade. The hog* is indeed regarded as corn in "a concentrated form." Maize is bulky and perishable, and it is found that it furnishes cheap food for animals. The latter, when killed and preserved, are in no danger of suffering from decay. They can be shipped at convenience. Accordingly, from four to five million hogs are annually slaughtered varying from 200,000 to 250,000 tons.

This unsettled feeling took a practical form in 1863, and a convention was called to consider if any remedy could be found to remove the causes of complaint. If any one will carefully read the proceedings, he will find that one opinion pervaded the meeting; that the remedy lies in the Saint Lawrence, and yet no speaker expressly said so. There is a suppressed recognition of the fact in the Memorial sent to Congress. The one desire is to obtain an access to the Atlantic; pointing out clearly what it is our duty to attempt. It is to deepen our Canals so as to offer a navigation of 15 feet, and to construct locks 250 feet long by 45 feet wide, to make our Canals 100 feet at bottom, to keep them open* day and night, to have them lighted in the dark, to enforce good management. If the three millions of tons which seek New York by the Erie Canal found their way partially to Boston and to Liverpool by the Saint Lawrence, the vessels bringing back a million tons of imports, and New England manufactures, the Canals would pay more than the interest of their cost and enlargement.

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* "And now my esteemed friends, let us make a slight descent; let us talk a little "about hogs, and the glorious West as a gigantic hog-pen. I must really beg you "not to laugh, for I am profoundly serious, and do earnestly assure you that the hog "is a very praise-worthy, interesting and important animal. For how, let me beg "to ask, could you possibly, without his benevolent and efficient aid and co-operation, bring down the whole of these five hundred millions of bushels of grain to the "sea? How could such a mountain mass of cereals, and especially of Indian corn, "ever be sold or disposed of? But thanks to the ingenuity of man and the necessity "of the case, the process has been found. The crop is condensed and reduced in "bulk by feeding it into an animal form more portable. The hog eats the corn, and "Europe eats the hog. Corn thus becomes incarnate; for what is a hog but fifteen "or twenty bushels of corn on four legs."—*Speech of Mr. S. B. Ruggles, of New York, at the Canal Convention of Chicago, June*, 1863. *Report* 49.

This National Ship Canal Convention was held at Chicago in June, 1863. It was attended by delegates from all parts of the United States to the number of five thousand. The object of the meeting was to advocate the enlargement of the Canals between the valley of the Mississippi and the Atlantic as of great national, commercial and military importance. But the meeting was hardly organized before Mr. Spaulding, of Ohio, moved that the subject of a Ship Canal around the Falls of Niagara was one which pre-eminently demanded consideration. In doing so, he advocated a Canal from seven to fourteen miles in length, to pass vessels of from 1,200 to 1,500 tons burden, the cost of which would be from two and a half to five millions of dollars. The ground on which he claimed that the work should be prosecuted at the national expense, was, that it would permit the passage of gunboats between Lakes Ontario and Erie, equal to any that can be put on the former by the British government. He then as a supplemental fact pointed out that vessels of a large class could by its means carry "the products of the great west cheaper than by "any other channel for the Atlantic coast" It is only necessary to turn to the map to see at once that such a Canal can never be meant for military purposes, for in the event of war it would necessitate that a *corps d'armée* should hold the Canadian side of the river. Captain Williams, of the United States Engineers, expressly admits that the route from Fort Schlosser to Lewiston "is clearly within the range "of howitzer and mortar batteries" He accordingly traced a second route which would have its discharge at Four Mile Creek on Lake Ontario. The locks to be 350 feet long, 70 feet wide and 12 feet deep. But even with this change there would still remain the exposed entrance from Buffalo to Grand Island on the Niagara River. The real purpose to be gained is the peaceful transmission of breadstuffs; nevertheless, hostile sentiments are appealed to, in order that produce may reach the ocean to feed the Eastern States. Throughout the whole of the proceedings the same tone of argument prevailed. Mr. Foster, on the part of Chicago, brought forward resolutions to improve under authority of the General Government, by slack water navigation, the Illinois and Des Plaines Rivers, by constructing a series of dams, with locks 75 feet wide and 350 feet in length, and to enlarge the Illinois and Michigan Canal to the like capacity, to admit the passage of gunboats to the Lakes and *vice versâ.* Further, to enlarge the locks of the Erie and Oswego Canals to pass gunboats 25 feet wide, 200 feet long, and drawing not less than six feet six inches of water.

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*At present by enactment, the Welland and Lachine Canals are closed on the Sunday, but the vessels which have been admitted previously can pass through the intermediate canals. Accordingly, although the two extreme lock-gates cannot be opened on that day, the connecting links of the navigation,—the Beauharnois, Cornwall and Williamsburgh Canals,—offer no impediment to the progress of any vessel. Should ever the inland navigation be developed, so that ocean going vessels constantly pass and repass, the continuance of this law must become a matter for consideration. The progress of a vessel from Chicago to Liverpool, should in no way be retarded by geographical distinctions. When at sea, it continues its course without intermission until it arrives at its destination; and the necessities of the situation will exact that no impediment be created before it reach the salt water. No reasonable objection could be urged against closing the canals, between half-past 10 and half-past 1 on the Sunday; by which means the men on duty on that day, and the crews of vessels could fulfil their religious obligations according to their consciences, and very little delay would arise. A regulation not bearing hard on the employés in other respects, for as the immense commerce, in a period near or remote, will exact that the canals be opened day and night, there must be two sets of lock-tenders, each of whom would enjoy alternately the weekly day of rest.

From the account of the proceedings it is evident that war was the last thought in the minds of the speakers. The sole idea was to obtain an outlet for the produce of the west because the existing routes are insufficient: nevertheless the tone of the debate took a deprecatory tone, and nearly every speaker seemed to fancy that the commerce of the Western Lakes was in the most imminent danger of being at once destroyed. The then Vice-President of the United States, Mr. Hamlin, told his audience "that there are channels of communica- "tion northward by which naval and military armaments "may be sent into the northern lakes by Great Britain "while we have no countervailing facilities." But Mr. Hamlin took good care to add that "the measure opens new "channels to your commerce, and facilitates the transporta- "tion of your vast commerce to market." General Walbridge of New York stated the case very plainly, and appears to have thought that all ambiguity was to be avoided. It seems by the Report that he was loudly called for, and after speaking at length, added—

"Mr. President and Gentlemen, I find myself beguiled "beyond what I intended. If this meeting was for the "practical object of constructing a line of communication "by long internal canals between the Mississippi River and "the Atlantic Coast for commercial purposes, the general "government has no right to do it, but if it be for military "purposes it is their imperative and bounden duty, and as "such, I shall advocate the measure." Mr. Washburn, of Illinois, considered that the Lakes were entirely defenceless, and so speaker followed speaker. It is pleasant, however, to know that amid this peculiar oratory, which every one present must have felt to be insincere, one mind was found to represent the cause of sense and reason.

Mr. Hubbel of Wisconsin, "For what purpose," he asked, "are these Canals a military necessity? How long will it "take to build them? Three, four or five years? What "military necessity will there be at the end of that time? "This rebellion? God forbid that it should last that long? "A war with England? When did we have a war with "England? Fifty years ago. When shall we have "another? Not for fifty years to come except by our "own volition. If John Bull had chosen to fight with "Brother Jonathan he would have done it last year, when "the South had us by the throat, now when we have got "the South by the throat and John Bull knows it, is he "going to venture his commerce against our armaments? "No! If John Bull fights with us, it will be during the "rebellion."

An incident occurred during the debate which fully confirms the view that the North-west desire to create new channels, so that their trade may be untrammelled; and that New York is equally anxious not to increase them. On Mr. Spaulding, of Ohio, avowing himself in favor of a Ship Canal from the Gulf of Mexico to the Gulf of Saint Lawrence, Mr. Ruggles of New York, demanded: "Who "ever heard before of the Gulf of Saint Lawrence in this "connection? Has not our whole struggle been to prevent "this Canadian diversion? A principal aim of the memorial to Congress and the documents issued by the Boards "of Trade, was to prevent our internal commerce from being "diverted from our own water courses, and sea-ports into "those of foreign nations. I do not say that this result "would certainly flow from the construction of this Ship "Canal around Niagara Falls, but to say the least it is "possible. But I do not mean to take ground against the "Ship Canal here, and perhaps not elsewhere; we cannot "hewever close our eyes to the magnitude of the conse"quences involved. The question whether the hundred "millions bushels of grain—soon to be multiplied to a thou-

"sand millions is to be poured into foreign ports rather than "into our own is a national question of the gravest import, "and one which deserves the consideration not only of this "Convention but of Congress. * * * I admit such a "work might produce some saving in transportation, and "might add to the military security of the country; but at "the same time we should keep our eyes fixed on the "preservation of our commerce."

Admissions of this character are so important that they cannot be too closely considered: especially when taken with the resolutions voted, which were to the effect, "that the "enlargement of Canals between the Mississippi and Atlantic "with Canals duly connecting the Lakes is of great national, "military, and commercial importance." That the work ought early to be undertaken, and that it should be accomplished by the national credit; and that when the cost was reimbursed to the National Treasury, the Canal should be toll free.

All that is here stated goes simply to point out the superiority of the Saint Lawrence route, and how indispensable it is to the West. No one can seriously think of sending freights for Europe by the Mississippi. Or even were this done certainly they would not follow that direction for the New England States, unless other avenues to the East were closed; for undoubtedly the latitude of the mouths of the Mississippi is suggestive of strong objections against the route. The climate is hot, the products of the West would suffer from its influence, and the voyage to Liverpool be prolonged some 3,000 miles. Before the war, the exports from New York against New Orleans were, generally speaking, in the proportion of a thousand to one.

There can be no Ship Canal from the West except by the Saint Lawrence. The advantages which it offers, cannot otherwise be obtained. To make a Ship Canal to New York even by Oswego, is an impossibility, and anything but a Ship Canal is of secondary importance to the West. Why should Chicago continue to pay toll to New York? Why should the Lake cities with their wealth and resources not import for themselves and transact their own business? The ocean is the prerogative of no State of the Union. And the West will seek the channel which conducts its commerce with the least cost and delay. With the Canadian Canals enlarged to a sufficient extent, a return trip could be made to Boston and back in forty days. It takes but twelve days for a propeller to reach Quebec from Chicago, even with the delays in the Welland Canal. From Quebec to Halifax is 1,000 miles; but should a propeller be able to pass through the Gut of Canso 150 miles would be saved. From Halifax to Boston the distance is 450 miles. The calculation of a trip at forty days is a moderate estimate. The enlargement of the locks would lead to a new description of vessels.* A

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*Within the last few years a formula has been introduced into the State of New York, by which the cost of freight on certain given conditions is closely calculated. It cannot however be admitted as in all respects satisfactory. For a class of reasonings it has its use. Doubtless, it grew out of the necessity of establishing some recognised data by which commercial problems could be treated; but the form is so general and vague, that it can be made to prove any thing. Admitting that a known result is a guide for what will happen under precisely similar circumstances, it must be remembered, that the exact and precise conditions of an event are rarely repeated; and that with respect to two events, in some respects identical, each may be marked by peculiar distinctive differences. Accordingly, it is not often that we can justly apply a precedent, which is good in its place, without concession or adaptation, until we prove that neither operation is necessary. The formula was first brought prominently forward by the elder Mr. McAlpine; and it has been accepted without enquiry by many. He estimates that the cost of transport per ton, per mile, is as follows:—

Ocean, long voyage....................	1			mill.
" short "	2	to	4	mills.
Lakes, long "	2			"
" short "	3	"	4	"
River Hudson, and of similar character (*sic*)	2½			
Saint Lawrence and Mississippi.............	3			"
Tributaries of Mississippi...............	5	"	10	"
Canal, Erie Enlargement................	4			"
" Other large but shorter........	5	"	6	"
" Ordinary size..................	5			"
" With great lockage..............	6	"	8	"
Railroads, transporting coal...............	6	"	10	"
" Not for coal, favorable lines and grades	12½			"
" Steep grades................	15	"	25	"

The object of this table, is to draw rapid and reliable comparisons of different routes, on accepted data. To attain this end, the theorem is worked out by increments which advance by the thousandth part of a dollar. The *modulus* is one ton carried one mile. Accordingly, in two opposing routes of one thousand miles each, propeller 230 feet long, with 33 feet width of beam; with 15 feet of hold, would carry easily one thousand tons, or 10,000 barrels of flour. The cost of such a vessel would be about $90,000, and for the forty days the daily working expenses may be estimated at $125 per day. There is no doubt that it could always count on a full cargo going to the East, and it would be a fair calculation that it would bring back 400 tons merchandize, either of imported goods taken from Boston in bond, or New England manufactures.

A trip would shew:—

Going, 10,000 barrels flour at $1........	$10,000
Returning, 400 tons merchandize at $6..	2,400
	$12,400

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one of them under-estimated one mill, and the other over-estimated one mill, it can be shown that the favored line is preferable to the other, to the amount of $2.00 a ton.

It is not insinuated that Mr. McAlpine ever misapplied his calculations, or in any way perverted them. This criticism is advanced to shew to what extent the principle may be strained. As an approximation it may aid in suggesting the probable cost of a ton of freight on a proposed route, the distance and characteristics of which are known. But the utility stops here; and the moment we attempt any close comparison by these figures, we leave the domain of fact. Nevertheless they have been applied positively enough. Thus, Mr. Clarke, in making the comparison of the freight of a ton of merchandise or produce from Chicago to Quebec, adduces these figures to prove that it will cost exactly 30 cents more by the Welland and the Saint Lawrence than by the Ottawa route; that is to say 3 cents on a barrel of flour, and Mr. Jarvis of New York, on similar data, proves a difference in favor of the Erie Canal of 12 3-10 cents per ton or 1 1-4 cents per barrel of flour from the foot of Lake Ontario to the Hudson River. There is in truth no law to dictate the price of freights, to say nothing of that word of meaning, "special rates." Every line of communication is marked by peculiarities either material or commercial, which determine the outlay of the forwarder, and to no slight extent the cost of transport. Even the rates which have previously been paid do not guide us for they vary during the season; and in an account of a series of freights, we have the maximum, the minimum and the average. We cannot always with this information calculate the peculiar causes of depression and increase. As an instance of the uncertainty of all such computation, freights on the St. Lawrence Canals were higher during the years the tolls were removed, than they were previously.

On a proposed line of Canal, the feasibility of which is under consideration, the calculations by Mr. McAlpine's formula may be of some help, with the proviso that they are not made to prove too much. They must however, be taken as a mere estimate, with an inquiry, if the party adducing them has any theory to advocate. Likewise before their acceptance, we must examine thoroughly into the basis on which they are advanced, but even then can we be sure of its application?

The true mode of comparison, and one in every way satisfactory, for it carries the means of refutation on its face, is to assume a class of vessel which is adapted for the navigation. Its cost for the number of days of a trip (going and coming) its capacity, the rates likely to be paid, the possible cargoes—data of this character will furnish tolerably certain guides by which a route may be estimated. Still, only to a certain extent, for the rate of freight is determined by expediency alone, whatever may be its calculated normal value.

Against 40 days expenses at $125	$5,000	
Tolls 1400 tons at 80 cts.	1120	
	——	$6,120
		$6,280

To pay interest, wear and tear, insurance and profit. A special advantage will likewise be obtained utterly unattainable by present lake craft. These vessels having made their last trip to Boston will not return to the Lakes to lie idle and unremunerative in the harbours for five months, but will proceed to the West Indies or South Africa, for profitable employment. The difference of gravity between salt and fresh water,* doubtless, would have an influence on the load water line, and would need consideration from the naval architect. The vessels might be built with the capacity of drawing deeper water during these winter months—not necessarily loading down to it in the Saint Lawrence—by which means they would become steadier and less crank. It must be recollected that the opening of this navigation would require a peculiar build of ship which, possibly could not be perfected at once.

Calculating five trips in the period of navigation, such a vessel would clear $31,400 in the season; for it is reasonable to suppose that during the five months she was engaged in the West India trade, or at South Africa, she would at least earn the cost of insurance for the whole year which may be taken between $5,000 and $7,000. A vessel costing $90,000, would possibly affect an insurance of

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* We may estimate that a Propeller drawing 14-ft-6 water in the St. Lawrence would be buoyed up in salt water from four to six inches. The specific gravity of salt water is 1.026 against the unity of fresh water. Shipwrights roughly estimate that 21 ft of draught in the river will draw 20 at sea. This difference is not an unfavorable feature in the Western route through the St. Lawrence to the Ocean, for vessels could take additional cargo, both from Quebec and Montreal, to Europe or the New England States, independently of the Western freight of grain. This consideration might also lead to the establishment of coaling stations below Quebec for outgoing vessels. On the other hand incoming vessels could regulate the supply of fuel, so that the requirements of the inland navigation in respect to the draught of the vessel could be observed.

$70,000, paying from 7 to 10 per cent premium. Accordingly the propeller would pay itself in three years. Among shipmasters, it is generally considered that the operation which effects this result in five years is perfectly satisfactory, for at the expiration of that time, the possession of the vessel, deteriorated some twenty per cent, is clear gain, with a continuance of the annual profit.

Those figures have been submitted in their present form to responsible and experienced forwarders, and they have been pronounced unimpugnable.

So many interests are connected with the carrying trade, that special arguments are appealed to, in proof of the peculiar advantages each can afford. Much stress has been laid upon a process, to which wheat is submitted in passing from the larger to the smaller vessel; or in being transferred from the propeller to the railway. It may be profitably examined in this place. It is held that by being raised in the elevator it is aired and dried, and accordingly improved. It is consequently pretended that when the bulk of a cargo of wheat is broken, it is positively benefitted, although a certain loss of measurement results. There may be some abstract truth in this view; but to reduce it to a practical bearing, so far as the question can be made to apply to the St. Lawrence route, it is difficult to find a responsible and disinterested person with the requisite experience, who will affirm that wheat shipped in Chicago in good condition and remaining in bulk while it passes through the St. Lawrence by sea to Boston, which it would reach in seventeen days, would be inferior to wheat shipped from the same place and passed through the elevators at Buffalo, and New York or Albany. The opinion however is advanced, that this intermediate handling of wheat is in every way advisable; but when the statement is carefully sifted, it will be found to have little bearing upon the real efficacy of transport by water. Certainly when loaded in ocean-going vessels it arrives at its destination safely enough, when the voyage has lasted for some weeks. It is hard to conceive why it should be otherwise in the inland waters of Canada.

Comparing the possible with the existing boat, we can observe the extended accommodation which may be attained. The Welland Canal propeller is 145 feet long with a width on the guards of 26 feet; although the declared measurement is 350 tons, it carries on a depth of 10 feet 4,400 bbls. of flour. Its expenses may be taken generally at $50 per day independently of tolls. The cost is from $27,000 to $30,000. It is this class of vessels which is now employed between Chicago and Oswego, for it can only take to Montreal 3,300 bbls. of flour, and is entirely incapable of proceeding to Boston.

The Saint Lawrence Canal propeller is really a noble vessel, but the mischief is, it cannot get further than Saint Catherines in the Welland Canal. "Her Majesty," the first of the above class lately built by Captain Perry of Toronto, cost $52,000. She is 180 feet long, and has 30 feet breadth of beam. Her measurement is 550 tons. Her cost, per day, crew and fuel, $85.

Drawing 10 ft. 6 in. she will carry *7000 bbls. flour, or 26,000 bushels grain.

Drawing 9 ft. St. Lawrence Canals, 4,400 bbls. flour, or 16,000 bushels grain.

Drawing 10 feet Welland Canal, 6,500 bbls. flour, or† 24,000 bushels grain.

An examination of the capacity of vessels in use, shows that the smaller cheaper propeller of the Welland is equal

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* 10 Barrels flour are reckoned as a ton of freight.

† For the purpose of determining the quantity of produce harvested and brought to market, American statisticians allow five bushels of grain to a barrel of flour, considering that it takes that quantity to manufacture a barrel of 196 lbs. of flour. In Canada, we have been accustomed to consider four and a half bushels an equivalent. A different proportion is observed, when flour is estimated as freight. A barrel of flour, with the staves headed and hooped, weighs on the average 220 lbs. A bushel of wheat weighs 60 lbs; therefore 100 barrels of flour as freight are equal to 3,666 bushels of wheat shipped.

in capacity in that Canal, to the larger propeller in the Saint Lawrence, owing to the additional foot of navigation in the Welland; and that it must lighter* to the extent of one quarter of its cargo to pass through the Lower Canals. On the other hand, the real advantage of build and tonnage is lost to the larger propeller from having no place where it can float to reach the Upper Lakes.

A full development of the navigation would at once change every consideration by which it is now regulated. Opposition from the Mississippi need not be argued, and there would remain only the Erie Canal, which always must be limited and peculiar. This route retains its trade, not from being inherently preferable, but in spite of the disadvantage and the expense of navigating it, and the higher tolls it imposes. The advantages which it extends are to be found at its terminus. If the western producer has no longer need of the benefit, he will cease to submit to the annoyance and expense. If, in his own vessel he can transmit his produce to Boston and New York, for they are but few hours distant to a propeller, why should he pay for transhipment, agencies at Buffalo, and Albany or New York? No appeal to nationality will create a meaningless and unnecessary patriotism, by which a man is unjust to himself; even when he is most willing to incur personal risk, and to make lavish sacrifices for the national honor. There is no reason why the Western flag should not pass through Canadian waters. It is respected and self-sustaining. On the route the crew receive a hearty welcome, and there never has been, and there is reason to believe there never will be, anything but good feeling on all sides. The route which is commercially the best must be taken.

The effect in this instance is quite plain. The Chicago forwarder retains in his control the grain he ships until he sells or stores it. He can count upon the period of its delivery to a few hours. Sending by express the samples for sale, it can be disposed of even before it arrives. Insured at the proper place, he can obtain an advance on it, if he desire to do so. Such arrangements as these are now effected, but no break of bulk arising, they could the more readily be carried out, as fewer contingencies will arise. The imports for the west in bond at Boston, will furnish the return freight, and here neither middle-man nor agent is necessary. For the first few months the new system might have its inconveniences; but they would rapidly disappear, as storehouses and elevators were built. In the present mode of business, the goods from the ocean must be landed; so that charge is always a constant; and there would remain only the handling from the bonding warehouse, which could be reduced to a minimum. Accordingly, the imports would be laid on the quays of Chicago at little more cost than they are delivered at New York; the up freight of course excepted, which must under any circumstances soever be cheaper by the Saint Lawrence. No railway could compete for any long period against the water on this extended length either as to time or cost, and if at all crowded the former would be inferior in regularity. But what benefits would at once be extended to the cities of the Lakes when they have become seaport. Chicago would rise at once to the dignity of a metropolis. Her supplies and wants, monetary and financial, would no longer be dependent on New York or Boston. Her relations would be at once extended directly to the European markets, where the products of that country are sold, and with which at present she has no communication but through an intermediary. It is true that the navigation from Chicago is unlike that of other waters; and special requirements are demanded to meet it. The difficulties are those of currents and head winds, incident to the various turns of the Saint Lawrence. Accompanying these objections, arises the common one of the wind veering round, even in easy and pleasant navigation. Impediments of this character at once disappear on the introduction of an auxiliary screw. A sailing vessel so furnished, on the principle of a man-of-war, which in ordinary circumstances trusts to her sails, and turns to steam only when obliged, is self-reliant under all circumstances. The necessity and the expense of towing is at once obviated; and a voyage would be performed as economically as from any other port and under any other circumstances, from an extreme point on the Lakes to China or South Africa. A coaling station below Quebec would supply the fuel used in the River and gulf, and a vessel would put to sea as reasonably fortified against contingency as possible.

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* I do not think that there is classical authority for this word as a verb; it is nevertheless in use with men who reduce the draught of a vessel, by removing the cargo to barges, or lighters. It certainly possesses the value of thorongbly describing an operation which otherwise takes a sentence to explain.

There is the political view likewise to be considered. Whether on sufficient or insufficient grounds the opinion has been frequently expressed, that the United States, considering Canada to be a weak point in the Imperial system, intend to assault it for purposes of conquest. Unhappily there cannot be a doubt that many of the leading politicians of the Republic have shown an unfriendly feeling to England. The imposition of the Passport system, which was perfectly inoperative to prevent any really dangerous person from entering the country; the notice to abrogate the Reciprocity Treaty which has worked admirably; the notice to terminate an arrangement to which we owe that peaceful character of the Lakes, which has led only to good will and kindly offices, are not measures of necessity. But are they evidences of hostility of feeling? May they not really all be traced to the unsatisfactory relations of the east and west in the matter of transport? The Chicago Canal Convention is ample proof of the fact. The State of New York has become the emporium of the South and West, and as the South turned from the political ascendency of the North, so the West has shown an earnest determination to be free from a supremacy which would restrict its communication with the sea. The attempt to repeal the Reciprocity Treaty,* in opposition to the true interests of the West, is adduced as ample proof of the selfish zeal by which the preponderance of the forwarders of the Erie Canal, and an unchanged commercial relationship with New York has been urged at their expense.

The former threw themselves into the most bloody, obstinate and costly war of modern times. The latter need but to turn to the peaceful waters of the Saint Lawrence, when Canada has wisely determined to offer them an ample navigation. The Southern States saw that in a few years they would be surrounded by states hostile in policy to them; and that a numerical majority would place them in the power of a party which had avowed its intention to change the constitution, and to govern the South, as subsidiary to the North. The West fears no political tyranny; but they have no outlet to the ocean except through Canada. They see however that a legislation inimical to their gaining this outlet is pressed forward. The lakes which have been free from armed vessels, are threatened to be occupied by purposeless navies. The worst passions are called into being, and the neighborly and kindly offices which have hitherto been interchanged, are peremptorily to be discontinued. The course of trade is to be controlled and fettered. Reciprocity is to be annulled. Their old markets must be discontinued; and they are told that beyond the frontier, no bushel of wheat, nor a load of hay, nor an ox nor an ass, nor any thing that is his, is to be bought and sold on either side, except on conditions worthy the dark ages.*

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* “There is no man in the west whose interest does not suffer, and will continue to suffer, unless a combined effort is made to have the Government retrace its steps on the reciprocity question. Every member of Congress and every Senator must understand that no tampering with outlets for Western products will be allowed. If there are any obstacles in the way they must be removed, or we must by our action at the polls, remove those who stand in the way of Western interests. This is no question of party politics—it is one of dollars and cents—it affects the prosperity of every Western State—it is felt in the pockets of every farmer—and the laboring man, thrown out of employment because want of transportation has clogged the wheels of business, feels it most of all. The necessities of the West will lay the corner-stone of a new ‘irrepressible conflict,’ unless her interests receive the attention they deserve, and which their present and increasing magnitude demands from those in power. It will be the commencement of a conflict between the natural rights of trade and the unnatural demands of monopoly, between the men who depend upon their own intelligence, industry and experience to bring their enterprise to a successful issue, and those who depend on Acts of Congress to increase their wealth. The Reciprocity Treaty was abrogated at the demand of monopolists. Let this class of men beware—their days are numbered—the West must and shall have unobstructed communication with the sea-board, and no party can long hold the reins of government which stand in the way of its accomplishment. One more illustration of our present suffering condition for want of sufficient transportation facilities, and I am done with ‘number two.’ Holders of provisions and produce in Chicago have been compelled to ship to New Orleans *via* Cairo, and thence by sea to New York, because, no matter what the rate of freight they were willing to pay northward, every line was so blocked up with business, they could not ship at all—so they must send their stuff nearly five thousand miles around, when their natural and proper line was not over nine hundred and ninety-six miles, *via* Michigan Central, Great Western of Canada, New York Central, and Hudson River Railroads. To-day, flour can be sent from Detroit *via* Michigan Central, and Illinois Central Railroads, down the Mississippi River to New Orleans from Cairo, through the Gulf of Mexico and around the extreme South of Florida, to New York, by sea, in less than one-half the time it would be in reaching that point going east from here, although the distance is only six hundred and eighty-two miles in the one direction, and nearly five thousand in the other. So dependent are we for a winter outlet through Canada, and so impossible is it to have the Canadian lines to do the business offered them. I call these facts to the attention of our delegation in Congress, and ask them to justify, if they can, their votes to repeal the reciprocity treaty. I call them also to the attention of those members from other States, who, forgetting the dignity of their position, appealed to the passions and prejudices, instead of the reason of their fellow-members, and rested their case on the clap-trap assertion, that the West was sustaining ‘rival transportation lines through a foreign country.’—*Detroit Free Press, March* 1865. *No. 2, in a series of communications by Mr. Duncan Stewart, of Detroit.*

When we consider the magnitude of this western commerce, of the toll it would pay, of the incidental benefits it would disseminate, totally independently of all other advantages, it is wonderful to account for the lassitude and and indifference which prevail in this Province. Not the least in these extended good results would be the affirmation of peaceful political relations really for ever. England can have no desire to go to war with the United States. No candid American, who remembers her dignity and forbearance in the Trent difficulty, can believe to the contrary. In that delicate emergency, all that was exacted was the vindication of her own character, without one undue or exaggerated act of vehemence. We Canadians are the last to desire hostilities. We have every thing to lose by war. To many it would be utter ruin. Yet if it come, we would not shrink from it; for Canada is peopled by a bold, enduring, spirited people, and aided and sustained by the mother country we must in the end prevail. But why should there be such discussions as these? Why should we in Canada who live in kindly relations with our neighbors, who desire loyally to give and to take the hand of fellowship, daily be threatened with destruction, and be made to feel that our tenure of peace is slight? Personally we have very kindly relations with the American. He is hospitable and good-natured. He comes to Toronto and accepts what we can offer, and certainly in his own country he is ready to return tenfold what he receives. Why then should the declamation of politicians be constantly directed against England, and unfriendly legislation to her dependencies be inaugurated? It may reasonably be said, that it receives much of its impulse from fear that the trade which now goes to New York will pass by the way of the Saint Lawrence. New York, however, has still a controlling influence left to retain the trade in the Hudson, which her capitalists would do well to consider. Admitted we deepen our canals. If New York would guarantee the enlargement of the Champlain Canal from Whitehall to similar dimensions, Canada would at once construct the Caughnawaga, and the New York trade would take that route, leaving the Erie to its way travel. So far as we are concerned, the advantage would not be lessened, for we could still enjoy the full revenue from our canals. This very intertwining of business relations is a great guarantee of peace. Men who buy and sell, whose interests are co-mingled, who furnish the means of life, and who control its pleasures and exigencies, have too much to lose, to listen for a moment to the promptings of passion or vindictiveness. Nations like men do not quarrel if they are under restraint; and the States of the North-West and the British Provinces, would be alike pledges on the part of the two countries of a co-existent prosperity; to each, war would be a dread from the embarrassments and losses it would entail.

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* The reader of Aristophanes, may recollect Dicæopolis in the Acharnians setting up the boundaries of his market place, and appointing his Agoranomi; where Peloponnesians, Megarians and Bœotians might buy and sell, but not Lamachus.

This state of feeling is sufficiently recognised in the Northwest of the United States, and in the State of New York. There is a deep sense of discontent existing in the former States, and admitted by the latter. In the commencement of 1864, a paper was read before the Buffalo Historical Society, by the Hon. E. S. Prosser, advocating the enlargement of the locks of the Erie Canal, in which the fact is forcibly dwelt upon. He says: "The leading "public journals in those States have so freely and so often "expressed their dissatisfaction in this regard, that doubtless "all present are familiar with their statements, their argu- "ments and their grievances. Hence, I will only allude to "one of them, which, substantially stated, 'that unless there "be provided, without much further delay, a more ample "and cheap avenue of transit to a foreign market through "this State to the City of New York, their necessities will "compel them, though against their inclination, to urge "such arrangements with the Canadian Government, with "or without the aid of their respective States, as shall "induce that Government to enlarge the Welland and St. "Lawrence Canals and locks to a size sufficient to admit "the passage of ships with twelve to fifteen hundred tons "cargo, to pass from the Lake ports to Liverpool without "transhipment."

Mr. Prosser does not affect to misunderstand the objects of the Chicago Convention. The Canal round the Falls of Niagara is, in his view a very plain matter. Although, "ostensibly for the passage of gunboats from Lake to Lake, "really in the main, it was urged by the people of the "Northwest, for the purpose of opening the way for direct

" trade from the Lake ports to Liverpool, in connection with
" the Canals around the Rapids of the St. Lawrence, requir-
" ing, as these short canals do, only five or six feet deepen-
" ing, by raising the towing paths and the lock-walls (the
" locks being 200 feet long by 44 wide) whereupon, these
" Lakes would be open to the world for ships to come and
" go, with cargoes of 1500 tons subject only to such slight
" tolls as Congress might impose around the Falls of Niag-
" ara, or the Canadian Government through the Welland
" and Saint Lawrence Canals."

This statement, it must be remembered, is not advanced by one interested in the development of the Saint Lawrence; but is brought forward simply to animate his State to further exertions. Mr. Prosser shows the Canal authorities, to whom he appeals, what can be effected, and it is well to transfer his argument here. The distance from New York to Liverpool is 3000 miles. From Buffalo to Liverpool by the Saint Lawrence, 3,200 miles. Accordingly the average rate of freight in a sailing vessel from New York ought to furnish the cost of freight in a sailing vessel from Buffalo, if the navigation be perfected through the Saint Lawrence: taking into consideration the cost of reaching the salt water by the River, in contra-distinction to reaching New York by the Erie Canal. The ocean freight is estimated at fifteen cents per bushel of wheat, or five dollars per ton, being the average of the last ten years. It must be borne in mind, that as these vessels would bring back return cargoes, that the return freight ought likewise to be much the same (all reasonable facilities being extended) by the St. Lawrence as by the other route. A comparison of the cost of the two routes is accordingly made by Mr. Prosser, as follows:—

" Assuming that the present tolls through the Canadian
" canals, now about 60 cents per net ton on wheat and flour,
" should be doubled upon the completion of these improve-

"ments to	$1 20
"That a vessel from Lake Erie, with 1,500 tons, requires, to make good time, a powerful tug at $100 per day for 7½ days, out to the ocean, and 7½ days returning; this expense charged to her outward cargo, per ton, is	1 00
"The average value of ship and cargo (of grain, flour and provisions), would be about $100,000, and the insurance by this route, though equally cheap in summer, is much higher late in the fall and would for the season, 6½ to 7 months, exceed the insurance from New York to Liverpool about ½ per cent., which, charged to the tons carried eastward, is per ton	0 30
"Extra cost by this route, per ton, from Buffalo to Liverpool over New York to Liverpool	2 50
"With our Canals as they are, grain cannot be transferred at Buffalo, transported to New York and put on board ship, without State tolls, for less than, per ton	3 00
"And when the quantity going forward is as large as in 1862, it will cost, without State tolls, about, per ton	4 00

"Nor can the rate be less by Railway."

As the argument in these pages is based on the supposition that the tolls through the enlarged canals would only be eighty cents per ton, the favorable result, theoretically shewn, will be increased forty cents per ton.

It is no extravagance to estimate, that if the Saint Lawrence Canals were improved 2,000,000 tons would at once pass to the seaboard, vessels bringing back 1,000,000 tons of imports. At present 2,700,000 tons of property pass eastward from the Lakes annually by the Erie Canal; the freights averaging about six dollars per ton from Buffalo to New York for long periods, two dollars of which is paid for tolls.

Taking the cost of the Welland and Saint Lawrence Canals at $13,000,000, and estimating the enlargement of the locks and canals, together with improvement of the River, and the Lake Saint Clair Flats at $12,000,000, we have the sum of $25,000,000. This amount at 6 per cent. interest and 2 per cent. added as an annual charge for a sinking fund, would require a revenue of $2,000,000. Adding to this sum the extreme estimate of $150,000 for maintenance, repairs, management and collection, we find the gross annual charge to be $2,150,000.

If we could count upon the high tolls which Mr. Prosser has named, we might anticipate a surplus over the charge, which could go to abate duties on English manufactures, in the reduction of taxation. But basing the estimate on the low tolls now paid, the promised results are satisfactory. From Lake Erie to Montreal wheat now pays 35 cents, and flour 45 cents. With the increased amount of freight, the larger vessel would take, with but a very trifling increase (speaking proportionately) of working expenses, the forwarder could afford to pay an increase of toll. The rate therefore might be named, without injury to any interest, as corn and wheat at 75 cents and flour at 85; averaging 80 cents. With 2,000,000 tons of exports, and 1,000,000 tons return freights, the income of the Canals from Western traffic alone will be $2,400,000. This estimate is totally independent of Canadian traffic proper, which up and down in 1863, was something under 650,000 tons; that is to say, from Canadian port to Canadian port.

The State of Illinois has officially represented the condition of the Western States with great force. In 1863, the Legislature passed a joint resolution, appointing Commissioners to proceed to Canada, and solicit "the earnest con-"sideration and early action upon a subject of great and "rapidly growing importance" both to Canada and the West, "of enlarged and cheaper outlets to the tide water, by way "of the Lakes and Rivers and new or enlarged Canals of "Canada."

This important document dwells upon "the growing "and already vital necessity for enlarged and cheaper avenues" to the Atlantic; and advances the "importance "both to Great Britain and the United States of so opening "and perfecting the navigation of the Saint Lawrence, as "to afford the commerce of both countries a cheap commu-"nication between the shipping ports on the North-western "States and Great Britain."

What the State of Illinois asks is a direct trade between the North-western States and Liverpool, on the plea "that "the increasing volume of business cannot be maintained "without recourse to the natural outlet of the Lakes." If this opportunity be vouchsafed, and the requisite facilities be given, the surplus produce will be increased with a rapidity even beyond that of the past century. It is estimated that from the State of Illinois alone, there has been shipped annually for the last ten years a surplus of food sufficient to feed ten millions of people, and at the same time there has been a positive waste from the inability to bring the crops profitably to market.

"The interior of North America," in the language of the Commissioners, "is drained by the Saint Lawrence, "which furnishes for the country bordering upon the Lakes "a natural highway to the sea. Through its deep channel "must pass the agricultural productions of the said Lake "region. The commercial spirit of the age forbids that "international jealousy should interfere with great natural "thoroughfares, and the Governments of Great Britain and "the United States will appreciate this spirit, and cheer-

"fully yield to its influence. The great avenue to the At-"lantic through the Saint Lawrence being once opened to "its largest capacity the laws of trade which it has never "been the policy of the Federal Government to abstract, "will carry the commerce of the Northwest through it."

There can be no more plainly expressed views than what are enunciated in this memorial, and we answer it by voting money for fortifications. It must be admitted in justice to the Executive that it is chiefly owing to a pressure from the Imperial Government that the Legislature has entered into the question of defences; for the Province is loyal to England, and fervently desires to continue its connection with the mother country. The working of our Government is far from perfect; but thoughtful men see the weak points, where we fail, and their hope is strong that with patience and ability, and time, the evils may be remedied. The duration of our connection with the mother country depends much on the attitude of Imperial statesmen towards us. It is not purely a question of money, and it is complex in many respects. But latterly the misunderstanding has not been slight, and Canada has been held to be insensible to duty and patriotism. The rejection of the Militia Bill of 1862 may partially account for this embarrassing condition of feeling.

The cause of the failure of this measure was two fold. Deep rooted discontent among the supporters of the ministry of that day, and the impracticable character of the bill itself. After three years interval, public opinion has in no way been changed regarding it; and it may be asserted that it is condemned equally by military men. The working of the system was estimated at $800,000 per annum. It was shown that it would have cost some million and a quarter; one-tenth of the sum which would improve our inland navigation. The bill was long and obscure, and effected no results at all commensurate with the cost. It simply exacted from the militia from fourteen to twenty-eight days drill in the year, sub-dividing the Province into districts, with expensive staffs.

The duty of self defence, difficult as it may be, is one which every people must meet, and certainly it is not one which this Province desires to evade. Canada would join the Imperial Government in any measure for Imperial purposes, and her population would be found wanting in none of those qualities, which are the traditionary characteristics of English manhood. Nor is the French Canadian an exception to this view. He is hardy, with few wants, reliant on the might of Great Britain, enterprising in the field, and possesses in a full measure the courage and dash which he inherits with his Gallic blood. The surprise accordingly was great, and it created positive pain for us to be told, that we were deficient both in courage and in sentiment, and that we meanly shrunk from contributing to our own defence. The charge, however, was arrogantly advanced by the English press, and by many public men. Nor has this unjust clamour died away; we hear periodical mutterings of the old discontent, and not unfrequently in the Imperial Parliament.

There are more ways of averting war than by large armies. The principle however is recognized in Canada, that our youth must be drilled and our militia organized, and that we must fully accept the responsibility of living by the side of a powerful and warlike neighbor. On the other hand there is no personal feeling existing between the American and the Canadian but what is kindly and genial. The American citizens who have established themselves in the Province, are as a rule men of high character, energetic and enterprising; the Canadian who has turned to the States for a home has invariably received sympathy, countenance and aid. But while this truth is not denied, and it cannot be gainsaid, the large armies in the field are pointed at as proof, that warlike employment must be created for men, who have permanently abandoned the peaceful occupations of ordinary life. If the territory of the United States were narrow, the future might furnish cause for anxiety ; but every soldier in the field can calculate on receiving an allotment of land when his services are not needed. He can occupy or sell the grant, and there is no reason to anticipate any extended dissatisfaction with this arrangement, or any countenance of the feeling should it arise. We may expect that the many thousands of soldiers, when the exigency of the day happily no longer exacts from them exertion and sacrifice, will return quietly, without effort, and with dignity to their old occupations.*

But while asserting, that although sincerely desirous of avoiding war, we would not hesitate to accept its responsibilities, we may by every law of statesmanship and humanity seek the means by which it may be averted. Setting aside the higher teachings of our civilization, the world has learned how costly and destructive war is ; and accordingly the more interests created, which war would affect, the greater the number of preventives brought to bear against it. By opening the Saint Lawrence to the North-western trade we simply create the desire for perpetual peace. Canada would not then be the weak point in the British Imperial system ; for war with England would rebound on the interests of a population which to-day may be reckoned at ten millions, and which in forty years may be four fold.

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* "The troops were now to be disbanded. Fifty thousand men, accustomed to the "profession of arms, were at once thrown on the world ; and experience seemed to "warrant the belief that this change would produce much misery and crime, that "the discharged veterans would be seen begging in every street, or that they would "be driven by hunger to pillage. But no such result followed. In a few months "there remained not a trace indicating that the most formidable army in the world "had just been absorbed into the mass of the community. The Royalists them-"selves confessed that in every department of honest industry, the discarded war-"riors prospered beyond other men, that none was charged with any theft or rob-"bery, that none was heard to ask an alm, and that, if a baker, a mason, or a wag-"goner attracted notice by his diligence and sobriety, he was in all probability one "of Oliver's old soldiers.—*Macaulay's History of England, Chap. II.*

The mother country therefore, in the interest of peace, is not only justified in aiding in the construction of the Canals, but it is her duty so to do, when no direct tax or cost will fall on the home population.

If this argument be correct, if the trade of the North-west be of the magnitude and extent asserted, if the necessity of seeking the ocean by the Saint Lawrence be proved, if competition with the Canals when enlarged be an impossibility, if these separate elements of the whole be each admitted it must follow that a very large revenue will be collected from the Canals, and that if the completed work be pledged to repay the loan, the risk of the borrower will be moderate. For such an expenditure Canada could borrow money at 6 per cent.; with the Imperial guarantee at 3 per cent. Estimating the sum necessary to develop the navigation at $12,000,000, $360,000 annually would be saved, and this sum could be annually spent on fortifications, should the Imperial Government still consider the expense a necessity, so that a defenceless frontier would not tempt a powerful and determined enemy. By these means we avoid special taxation; the resources of the country remain unweakened. It must be borne in mind that this Province can never of its own accord drift into a war with the United States. Any error or shortcomings on our part would be immediately set right by Imperial authority. It is by our connection with England alone that we shall be drawn into the quarrel: it will be in her offence or defence that our future will be merged. May we not ask such aid as this, to anticipate an undesirable contingency? By guaranteeing two and a half millions sterling, England may remove indefinitely all prospect of war, extend to Canada the means of fortifying the frontier without taxing the population, and maintain her ascendency on the American continent at little or no risk.

There is certainly the abstract possibility that the United States coveting Canada for its own sake, may carefully mature her plans, and await her opportunity to attack it. England may not always be at peace with other nations, and a European war may draw her into the vortex, so that she could little aid her transatlantic possessions, and in the unequal contest Canada would succumb. Generally an object is desired from some cause, either of value or of sentiment, and the possession of this Province by the United States, at the outrage of international law and right principle, could be advocated only on some broad ground of policy and necessity. Four motives present themselves as likely to influence the policy of Washington: the extension of territory; the desire to obtain an outlet for the lakes; unwillingness that a European power should continue its foothold on this continent; or a morbid wish to injure and humiliate England.

In examining into a contingency of this character, much necessarily depends on the peculiar tone of mind of the inquirer; and as the argument is after all only based on opinion, its discussion may be interminable, and in the end would be, at best, but mere assertion. Nevertheless, English journalists have advanced this probability, and the writers who have brought it forward are among those who have been desirous of doing justice to Canada, and have not joined in the clamour with which we have been assailed. They have pointed out this contingency, with more or less gentleness, as necessary to make us remember that we must help ourselves. The devotion of Canada to British rule is one of the glories of the Empire. Separated from her by thousands of miles, brought into friendly contact with a people who claim to have institutions more advanced and more favorable to individual prosperity, possessing the same language, and in a large sense the same laws as ourselves, our transfer from one nationality to the other would be cumbered with few dissonances in these material aspects. Were we dissatisfied there is every inducement to quiet our discontent by turning from the source of our misfortune. With all this we cling to our nationality as something precious; and from the first settlement of the country, this devotion has been apparent in every hour of trial and difficulty. Those who speak of the Canadian as disinclined to any effort cannot know the history of the Province. It is this injustice which has been and is keenly felt. Anger, however, will not better it. All we can do is earnestly to protest, and to submit as a refutation our past history and our present character.*

But why should the United States desire to possess

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* The debate in the Imperial House of Commons of 23rd March, although gratifying in the extreme to every one in the Province, may be adduced as a proof that Canada is still misjudged in this respect. Mr. Cardwell said "As to the plan now "before the House, it was not possible three years ago to ask Parliament for a large "grant for the defence of Canada, for Canada then was making no exertions for her "own defence. But Canada has now trained a large number of officers to take "command of her militia; she is increasing the number of military schools with a "view to train a larger number of officers; her volunteers are now engaged in active "service, receiving great praise from the inspecting officer, and acquiring popularity "and infusing a military spirit among the colonists." Lord Bury, however, had clearly laid down the true character of the vote on the Militia Bill in the Canadian Legislature in 1862, before Mr. Cardwell spoke. He said:

"Having some personal knowledge of the country, he only wished to make a few prac-"tical remarks. (Hear, hear.) He felt it would be an injustice in any one who had "lived among the Canadian population not to say, when such a matter as this was "under discussion, that he believed they were in temper, in bone and sinew, in "manners like ourselves, and able and willing to defend themselves. Like our-"selves, they had representative government in Canada. Having conceded this to "them,—having made them free, we could not be surprised if, when under circum-"stances of great internal difficulty a militia bill was presented to them, they took "occasion to turn out an unpopular government. We did not like that proceeding, "because we wished them to make provision for their own defence. But, having "given them responsible government, we cannot blame them for exercising it. "Now that difficulty was swept away; the very men who rejected the Militia bill "were, he believed, ready to do far more than ever had yet been proposed to put Can-"ada in a state of defence. Even those who had been turned out were ready to "join with them, seeing the necessity of being prepared. It was not, he believed, "the wish of the Canadian people to throw the burden of their defence on this "country; they were prepared to take their fair share of it."

As a consequence, what a man of the eminence of Mr. Cardwell, says, has much weight: and the mischief is that an assertion repeatedly made by contemporary public men and writers, is hereafter incorporated into the history of the country. Whoever be Mr. Cardwell's informant, the statement which he repeated does not correctly set forth the facts of the case. It is to be hoped that British statesmen will diligently examine into the contradiction of the stigma too many have affixed on Canada, as Lord Bury advanced it, before they persevere in the opinions they have expressed; for otherwise they commit great injustice to us, which I am positive that in no way they desire to do. It may be agreeable to Lord Bury to learn that his many friends in Canada are deeply sensible of his frequent and able efforts on behalf of the Province, and that they watch his career with interest, sympathy and confidence.

Canada? The map of North America is ample proof that it cannot be for the sake of territory. On the other hand, the diversity of interests would seem to make it improbable that the republic would engage in a war to obtain an outlet for the North-East to the ocean; when it is a matter of notoriety that the enlargement of the locks on the Erie Canal cannot be carried in the New York Legislature, and the attempt is being made to throw the cost on the general government. The love of conquest pure and simple is also a prompting motive which must be theoretically considered; but before it can be entertained, we must regard the whole population as hopelessly insane. As in England, no war can be undertaken in the United States unless sustained by popular sympathy. If Canada were independent, poor and weak, there would be little glory in thirty millions of people overrunning it; and literally nothing to offer to satisfy the imagination, or to awaken the national pride by such a conquest. The cause then remains of objection to any European power holding possessions on the continent, which in other words is holding us accountable for our connection with England; for it is unimportant whether the jealousy is abstract as a matter of principle, or the ill feeling be applied and determined by special cause and circumstance. Therefore when we say in Canada, that we can only come into collision with the United States through our connection with England, we think we truly state the case: further, we conceive that the fact ought not to be disputed in the mother country. It has been so stated by men of eminence, fairly and unmistakeably; but the assertion has been contradicted, we think both unjustly and too frequently in a somewhat inconsiderate spirit. Nevertheless for good, or for evil, our lot is interwoven with the well being of the mother country, especially in its relations with the United States; while our more limited influence is likewise perceptibly felt in a less degree. The policy which assures peace to Canada must, above all others, be welcomed at home.

Independently of the Provincial view of revenue and defence, of the establishment of stable friendly relations with the United States, and of the certainty that the commerce of the country would be widened, there are special circumstances in connection with Western Canada, which must be brought forward. The facts must be admitted that every interest is depressed, that money is scarce, that there is no prospect of new works being undertaken, and trade is reduced to the mere minimum routine of every day life. Latterly a feeling has gained ground, that by no means a weak or uninfluential party in the mother country is indifferent to the possession of Canada, and seeks only an excuse to be free from the embarrassment of the connection. The consequence is that men are to be found who urge, that if this be so, annexation may as well be brought to pass at the present period as at any other time. The activity of the United States is adduced as proof of the greater material prosperity we would attain by the measure; but the truth really is, that this activity is confined entirely to the main avenues leading to the West, and that beyond the influence of this movement, there is no more display of exuberant energy than in Canada; indeed in many localities much less. We are not a particularly patient people, and we wait for a result with some fretfulness. In some instances our complaints may be somewhat unwarranted; but at the same time there cannot be a doubt, that wise legislation could effect much change in our present unsatisfactory condition. Within the last few months many have sought the United States, from the impossibility of obtaining a livelihood in Canada. The passport system* has clearly established the fact. Most of these men are artizans, not the least fitted to go upon land. But at the same time it must be confessed, that many of the population whose antecedents have qualified them for agricultural life crowd into the cities, in the place of pushing northward and developing the soil. This tendency to abandon the country districts will eventually work its own cure in the want and misery it will lead to. For the moment it can only be deplored, for it is above the reach of legislation. The very contrary is seen in the Western States. Certainly it is in this direction that the wealth of the Province can be most legitimately increased. For many years our manufactures must be limited. The market is too small, and the whole community cannot be unduly taxed to sustain a small number in a prosperous pursuit. It must therefore be admitted, that there is much in our condition, which can only be alleviated by time and circumstances.

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* I learn from the Hon. Mr. Thurston, the American Consul at Toronto, that the emigration from Canada to the United States during the last four months has been considerable; and that in the majority of cases, the parties having their passports *visés* by him, were permanently leaving the Province. Mr. Thurston has been of

Still there is a commerce which is the property of this district of Canada, and which should not be driven from it. If the Canals were deepened, the sea-going vessel would come to the wharves of the Lakes at less cost than is now paid for transhipment and brokerage at Montreal, and River carriage. The tendency would be to concentrate business in Western Canada. One branch of industry would at once be created, the construction of sea-going vessels at Georgian Bay, which would pass lightened through the Canals, to draw twenty feet of water when laden. The navigation of the Lakes and Rivers would also be performed in a different class of vessel from that at present in use, and these vessels, equally with the marine of the Western States, instead of lying idle on the stocks non-productive, and their crews without occupation, could on the approach of winter

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much assistance to me in furnishing me information, when he could consistently do so with the discharge of his duties. There are few public men who have a more thorough knowledge of the Canadian trade in its relation to the United States, than this zealous and able official.

pass from the Lakes to the seaboard, and trade between the West India Islands, or engage in other profitable voyages. Ice could be made an article of traffic. It is estimated that a cargo of ice is worth a cargo of coffee. Lumber could be constantly exchanged for tropical products; butter, beef, pork, and flour, could be taken direct to markets where we would obtain sugar for them. At present, Natal, in South Africa, is supplied with lumber from England. If there is any thing we could compete with in other countries, it is in this article, the return cargo being of sugar. There are other minor manufactures which we conld export. Petroleum, Ale and Porter, Corn Starch, Pot and Pearl Ashes; and a trade which is scarcely in existence in Western Canada, pork packing would grow into vigor from the demand upon it. For the provision of the ocean-going vessels would be an industry to some extent of itself, not simply in this but in other respects.

It is reasonable to suppose that the commerce passing through Canadian waters would extend along its course a vivifying influence. The Province would then become, not simply one of the main avenues of communication with the West, but possibly the principal one. All the bustle and animation which the traveller in the United States necessarily finds on the great lines of traffic, and which to him are matter of so much surprise, would be witnessed with us. Surely ends like these without even the consideration of the greater desideratum,—an increase of revenue,—and the assurance of peace may, justly be regarded as Provincial. They would not be confined to one locality; and no cities would be more benefitted in the general accession of prosperity than Montreal and Quebec. The Western States look with equal anxiety for the relief to their embarrassment. The whole valley of the Saint Lawrence is buoyed up by a common hope. No man in Western Canada, unfortunately, has the least doubt of the depres sion which is bearing it down, or fails to feel the greatest anxiety with regard to its future. This condition of being explains the attention obtained by any scheme promising change and improvement. Many of us are not unlike the invalid, who hopelessly stricken by disease, listens to the remedy of the charlatan in sheer desperation, only to excite his distemper and increase his sufferings. It is not the expenditure of a few thousand dollars, which although granting temporary relief, will permanently benefit our condition. Our advance in prosperity can really be effected only by an enlarged policy, not conceived for a locality, but for the whole Province.

There are many considerations connected with deepening the canals which must be carefully weighed. The first which arises is the depth which can be judiciously advocated owing to the depths of the various harbors, and the obstructions which at various points exist in the river. In advocating a depth of 15 feet on the lock sills, with locks 45 feet wide, and 250 feet long, it must be remembered that the main object in view, is to obtain revenue by the sea-going propellers of the North-West. It is accordingly not a sufficient argument against the project to adduce the fact, that most of the harbors on the lakes, indeed, almost all of them on Lake Erie, have only twelve feet of water. Such harbors as these must from time to time be improved; for as a rule they are capable of improvement. It is likewise to be feared that to attain this depth in the rivers and lakes, heavy expense must be incurred. From Chicago to the Welland Canal the navigation is marked by the one difficulty of passing from the entrance to the Detroit River, to Point Pelée on Lake Erie. There is a strong current in the Detroit River, and at its discharge into Lake Saint Clair, flats have been created by the deposits of a long geological epoch. Undoubtedly, they can be dredged through, and sufficient depth obtained; but for sailing vessels, the route will constantly be one of trial, from the necessity of rapidly turning from one direction to another, actually passing round about two-thirds of a circle in 130 miles. A sailing vessel armed with an auxiliary screw would be quite independent in this navigation. But sailing vessels are generally towed through these perplexities. To remove this annoyance, a canal has been proposed from Rond d'eau, a known harbor of great capacity east of Point Pelée, either to the foot of the Detroit River or direct to Lake Huron. It would lessen the navigation eighty miles, and do away with all the trouble experienced on the Saint Clair Flats, and in entering Lake Erie. Rond d'eau is opposite Cleveland, Ohio, and between fifty and sixty miles distance from it. There are no particular difficulties in the route. The land is generally level, and as Lake Huron is 7 feet above Lake Erie, no extraordinarily expensive cutting may be anticipated. Such a canal would be from forty to fifty miles long, and it would cost some millions of dollars; accordingly it would have to remain unconsidered until the accomplishment of the greater work. But undoubtedly a time will come, when its necessity may be established. With 3,000,000 tons passage through it at 20 cents, a revenue of $600,000 would result, and allowing $50,000 for maintenance and repairs, the $540,000 represents a capital of $9,000,000, which would be about $180,000 a mile. It must be remembered that a guard lock at each end, and one lift lock, are all that is required.*

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* The difficulties enumerated between Lakes Erie and Huron are pointed to, as an unanswerable argument why the Toronto and Georgian Bay Canal should be undertaken. It is conceded that great improvement over the Saint Clair Flats is desirable, but the project entirely to avoid the dangers and inconveniences of this part of the valley of the St. Lawrence must be postponed until the development of the whole line of navigation be attained, of course including a channel sufficiently deep through this locality. But it does not by any means follow that the Georgian Bay Canal is the only remedy at our disposal. Indeed narrowing the experiment to this view, it is evident that a Canal from Rond D'Eau to Lake Huron is preferable from the circumstance that it would cost about one third the expenditure, and would leave nothing to be desired. When the money to construct the work can be obtained without undue sacrifice, it will necessarily be undertaken as a part of the scheme for the development of the St. Lawrence.

The deepening of the Rapids of the St. Lawrence has been the subject of frequent inquiry and examination. They were elaborately surveyed in 1854 by Colonel De Raasloff and M. Maillefert, and experiments were made as to the possibility of removing obstructions in the River by the means of sub-marine blasting. The estimate for making a channel 200 feet wide and between 12 feet and 13 feet deep at low summer water, was named at $900,000; the greatest expense being called for in the rapids overcome by the Beauharnois Canal. The cost of the Galops Rapid was stated at $44,928, and the North Channel of the Longue Sault at $68,792. The St. Lawrence is described by these gentlemen as navigable during low summer water from Prescott to the foot of Lake Saint Francis for vessels drawing 8 feet, and through Lake Saint Louis for vessels drawing 10 feet.

The Galops, according to the Map, have generally from 17 feet to 20 water, excepting on the Shoal which extends from Big Island to the main shore, and a small shoal somewhat to the east of Adams' Island. In these localities the depth varies from 8 feet to 12 feet. The larger runs across irregularly, and may be considered to require the excavation of the channel through an extent of 300 feet.

The Longue Sault Rapid has a depth of water of at least 17 feet (by the Map) excepting at the *chute*, which is marked 12 feet. The ridge appears to be about 550 feet across, with an irregular side shoal of about 300 feet base, with a maximum ordnate of 120 feet.

The lower Rapids—the Coteau, the Cedars, the Cascades, above Lake Saint Louis, and the Sault Saint Louis, towards Montreal, it is to be feared cannot be deepened to any extent. The inquiry, however, by no means appertains to the scheme of developing the navigation of the St. Lawrence for sea-going vessels. The possible moderate cost of the work on the Galops, and the Longue Sault, might justify the experiment in their case, but there is no positive necessity why it should be made. But if the lower rapids were made navigable, sailing vessels could not navigate them, and it is problematical if they would be towed down.

But Lake Saint Francis, and Lake Saint Louis are positive impediments to be met and considered. The former has a soft sandy bottom, which could easily be dredged, but would require constantly to be watched, as the channel would soon fill again. The latter consists of harder and more expansive material to excavate; but when the work was done, it is probable that the cut would continue open. The expense of obtaining sufficient depth in these two localities, can only be known by examination. Doubtless, it would be great.

Indeed the improvement which the upper St. Lawrence in its whole extent, will ultimately admit, must be determined, likewise by examination, for I cannot learn that any one can speak authoritatively on the subject. Admitting that it may take years before a channel of 15 feet is attained, and that it be conceded that that depth may eventually be attained, we could construct the locks to that depth, in the first instance and obtain at once in the lakes and rivers, the nearest practicable corresponding navigation, and year by year perfect the route to the desired capacity, gradually extending it as judgment and expediency suggested.

One source of expense would be caused by the continuance of the navigation during the progress of the work. In some instances the enlarged lock can be built by the side of the present lock; in others the stone must be previously got out, cut, and fitted; and the masons can work at the walls required to be heightened and lengthened, in the intervening month between the thaw and the opening of navigation. In cases where the bank has to be raised and widened, the material can be deposited in summer: when the reaches have to be deepened, the work must be carried on after the water has been let out at the close of the navigation.

Such a policy as this is truly national. National not simply as it would affect Canada, but equally as it would harmonize the relations of war and peace between the mother country and the United States. At the same time, the cost is no immense and almost fabulous amount to make the experiment impossible. The sum called for really is about ninety per cent of the Provincial Revenue, and of all the projects brought forward, not one of which aims at similar consequences, it will cost the least; exacting only half what would be swallowed up, either in the Toronto and Georgian Bay Canal, or the Ottawa and French River Navigation. It may be that the public mind is not ready to estimate its magnitude, and that many public men may conceive that there is a pledge on the part of the Province that the Intercolonial Railway should first be constructed. If this really be the case, the development of our navigation, a thousand fold more important, can certainly be effected at the same time. But England has the one desire with regard to us, to aid in establishing our happiness and prosperity; and she will accede to any policy which she can understand will increase our civilization and develop our material advancement.

The remedy lies with ourselves. If the argument which has been advanced here is superficial, ill-considered and unsound, it will soon be forgotten; and the little attention it may create will be as evanescent as the thought given by the passenger to some passing street event. If it be true and just, the impression it may cause cannot be so dissipated. The conviction must pass from mind to mind, until it becomes a dogma in our political faith and is equally accepted by Imperial statesmen. Once established as sound and feasible, Western Canada need only to be firm in order o attain its consummation. If constituencies, by constitutional means, make their desires known, and return members to the Legislature who will perseveringly advocate them, no Ministry can long deny the improvement; for no Ministry can withstand the opposition, which a refusal on their part would call forth.

One of two results is indispensably necessary. Either that the policy advocated in these pages be disproved, argued away, and condemned as faulty and ill-judged; or that it be accepted, admitted, and carried out without delay. Our present depressed condition requires a healthful and invigorating stimulus.

FINIS.

TABLE, SHOWING THE INCREASE OF POPULATION, AND OF THE NUMBER OF ACRES OF IMPROVED LAND IN THE STATES NORTH-WEST OF THE OHIO RIVER, AND THE UPPER MISSISSIPPI BASIN, FROM 1800 TO 1860.

STATES.	Area of Square Miles.	1800.		1810.		1820.		1830.		1840.		1850.		1860.	
		Population	Improved Land	Population	Improved Land	Population	Improved Land	Population	Improved Land	Population	Improved Land	Population	Improved Land	Population	Improved Land
Ohio	39,964	45,365	225,675	230,760	225,675	581,295	2,892,456	937,903	4,665,000	1,519,467	7,558,750	1,980,329	9,851,498	2,339,511	12,665,587
Michigan.. ...	56,243	....	....	4,762	....	8,765	....	81,639	....	212,267	....	397,654	1,929,110	749,113	8,419,861
Indiana	33,809	4,875	24,890	24,520	125,530	147,178	751,445	343,031	1,751,409	685,866	3,485,729	988,416	5,046,548	1,350,428	8,161,717
Illinois	55,405	......	....	12,282	72,692	55,162	825,272	157,445	931,860	476,183	2,818,873	851,470	5,039,545	1,711,951	13,251,478
Missouri......	67,380	....	....	20,845	89,805	66,557	286,870	140,455	605,117	383,702	1,653,001	682,044	2,938,425	1,182,012	6,246,871
Iowa.........	55,045	....	....	....	....	....	....	....	....	43,112	164,969	192,214	824,682	674,918	3,780,253
Wisconsin....	53,924	......	....	....	....	....	....	....	....	30,945	105,930	305,891	1,045,499	775,881	8,746,036
Minnesota....	83,531	....	....	....	....	....	....	....	....	....	....	6,077	5,085	172,123	554,397
Kansas.......	80,000	....	....	....	....	....	....	....	....	....	....	....	....	107,206	372,855
Totals.....	525,301	50,240	250,565	293,169	518,702	858,957	4,256,043	1,610,473	7,953,386	3,350,542	15,806,752	5,403,595	26,680,332	9,063,143	52,199,050

STATEMENT, SHOWING THE INCREASE IN SOME OF THE PRODUCTS OF AGRICULTURE IN THE EIGHT GRAIN-GROWING STATES, FOR TEN YEARS, ENDING IN 1860.

STATES.	WHEAT, bushels.		CORN, bushels.		OATS, bushels.		RYE, bushels.		BARLEY, bushels		SWINE, head.		CATTLE, head.	
	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.	1850.	1860.
Ohio......	14,487,351	14,532,570	59,078,695	70,637,140	13,472,742	15,479,133	425,918	656,146	354,358	1,601,082	1,964,770	2,175,623	1,358,947	1,657,850
Indiana ...	6,214,458	15,219,120	52,964,363	69,641,591	5,655,014	5,028,755	78,792	400,226	45,483	296,374	2,263,776	2,498,528	714,666	1,170,005
Illinois ...	9,414,575	24,159,500	57,646,984	115,296,779	10,087,241	15,336,072	83,364	961,322	110,795	1,175,651	1,915,907	2,279,722	912,036	1,505,581
Michigan..	4,925,889	8,313,185	5,641,420	12,152,110	2,866,056	4,078,098	105,871	497,197	75,249	305,914	205,847	374,664	274,497	534,267
Wisconsin	4,286,131	15,812,625	1,988,979	7,565,290	3,414,672	11,059,270	81,253	888,534	209,692	678,992	159,276	383,957	183,433	512,866
Minnesota	1,401	2,195,812	16,725	2,987,570	30,582	2,202,050	125	124,259	1,216	125,180	734	101,252	2,002	119,003
Iowa.....	1,530,581	8,433,205	8,656,799	41,116,994	1,524,345	5,879,653	19,916	176,055	25,093	454,116	323,247	921,161	136,621	536,254
Missouri..	2,981,652	4,227,585	36,214,537	72,892,157	5,278,079	3,680,870	44,268	293,262	9,631	228,502	1,702,625	2,354,425	791,510	1,168,984
Totals..	43,842,038	89,293,603	222,208,502	392,289,631	42,328,731	62,738,901	789,507	3,937,001	831,517	4,865,761	8,586,182	11,039,332	4,373,712	7,204,810

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